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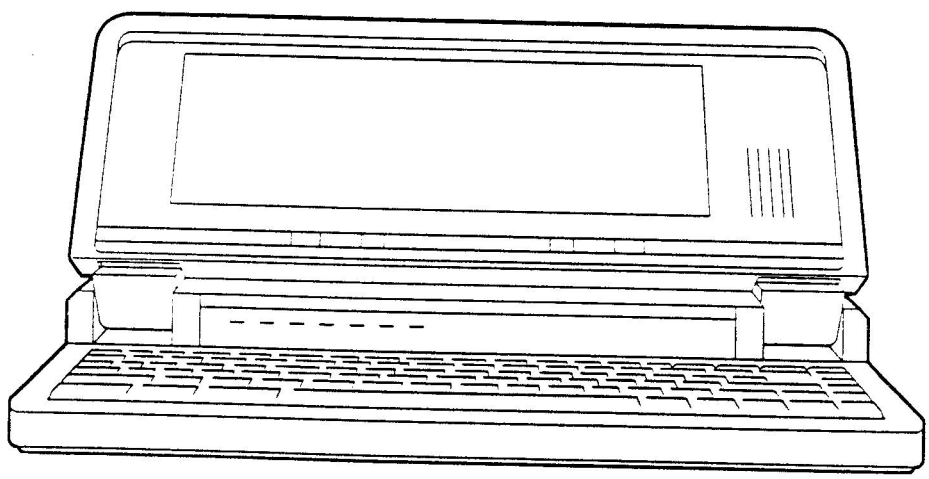

M i n i s P o r t

Service Manual

860-212

585-303-01

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Zenith Data Systems Corporation
St. Joseph, Michigan 49085

Contents

Chapter 1 — Product Description

Base Computer 1-3

Operation 1-5

- Powerup 1-5
- Computer Reset 1-7
- The Monitor Program 1-8
- Boot Command 1-9

ROM-Based Tests 1-10

Chapter 2 — Installation

Unpacking the Computer 2-1

Setup 2-2

- Portable Operation 2-2
- Desktop Operation 2-2

Installation of Options 2-3

- Static Precautions 2-3
- Modem Card 2-4
- One-Megabyte Memory Module 2-5

Battery Replacement 2-6

- Ni-Cad Battery Pack 2-6
- Lithium Batteries 2-7

Chapter 3 — Disassembly

Static Precautions 3-1

Modem 3-2

Case Bottom 3-3

Main Board 3-4

Battery Box 3-6

Disk Drive 3-7

Keyboard 3-8

LED Display Card 3-9
DC-to-DC Converter Card (Power Supply Card) 3-10
Top Assembly, Internal Floppy Disk Version 3-11
LCD Cover 3-11
LCD Display 3-12
Brightness/Contrast Card 3-13
Speaker 3-13
Top Assembly, Internal Hard Disk Version 3-14
LCD Cover 3-14
LCD Display 3-15
Brightness/Contrast Card 3-16
Speaker 3-16
Hinge Assembly 3-17
Latch 3-18
Security Bracket 3-18

Chapter 4 — Troubleshooting

Preliminary Checks 4-1
Powerup 4-1
Troubleshooting Charts 4-2
Disk-Based Diagnostics 4-5
Power-Up and Error Messages 4-5
Disabling an Unknown Password 4-14

Chapter 5 — Parts List

Specifications

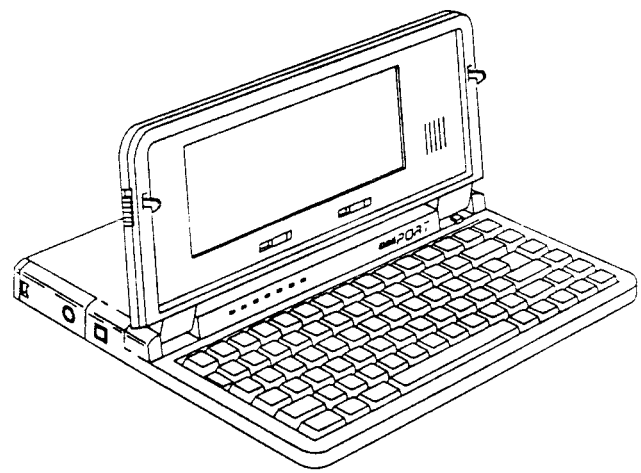
Chapter 1

Product Description

The MinisPort Portable Computer, shown in Figure 1-1, is an 8088-based, PC-compatible notebook sized computer. The computer supports up to 2M (megabytes) of memory. Standard features are serial and parallel communications ports; CGA-type, RGBI, TTL-level, video output to an internal LCD display or an external monitor; external floppy disk drive support; and optional modem support. The MinisPort includes the following models:

- Floppy disk drive (2-inch) plus silicon disk drive models (ZL-1, ZL-2) operating at dual speeds of 8 MHz and 4.77 MHz.
- Hard disk drive (20-megabyte) and silicon disk drive models (ZL-1-H, ZL-2-H) operating at dual speeds of 10 MHz and 4.77 MHz.

Figure 1-1. *MinisPort Portable Computer*



This service manual includes operation, troubleshooting, and service procedures to the major assembly level.

Related Materials — In addition to this service guide, the following are available from Zenith Data Systems:

- *MinisPort Portable Computer Owner's Manual*, part number 595-4214. This manual covers basic operation of the ZL-1 and ZL-2 models.
- *MinisPort HD Portable Computer Owner's Manual*, part number 595-4686. This manual covers basic operation of the ZL-1-H and ZL-2-H models.
- *MinisPort Portable Computer Technical Reference Manual*, part number 595-4354.
- Disk-Based Diagnostics, model CB-31-07.

Options and peripheral equipment for this computer have separate manuals which are not listed here.

Tools — Use the following tools and equipment to install, repair, and maintain this computer:

- Small flat-blade screwdriver
- Medium flat-blade screwdriver
- Small phillips screwdriver
- #2 phillips screwdriver
- 3/16" hex driver
- Temperature-controlled soldering and desoldering equipment.

Safety Precautions — To avoid potential shock or personal injury, use the following precautions when servicing this computer:

- Use a grounded AC power source.
- Disconnect AC power and remove the Ni-Cad battery before opening the case.
- Avoid power-ground shorts.

To prevent damage to the computer:

- Do not connect power if condensation is present on the cabinet or LCD panel.
- Let the components adjust to room temperature. An extremely warm or cold environment affects computer operation.

Base Computer

The computer provides all processing functions, an LCD display, a floppy or a hard disk drive, RAM and ROM silicon disk drives, and a keyboard. It has one serial and one parallel port for peripheral connections and connectors for an optional modem and external drive.

The computer consists of seven major assemblies:

- Main board
- LCD display panel
- DC-to-DC converter card
- Brightness/contrast card
- LED display card
- Disk drive
- 80-key keyboard.

Main Board — The main board contains all circuitry for processing and interface tasks in the computer. It provides the following functions:

- Central processing
- Memory control
- DMA control
- Keyboard interface
- Interrupt control
- Disk control
- Real-time clock
- System timing
- Buffer control
- Main memory interface
- I/O port control
- Bus/clock control.

LCD Display — The internal LCD is a 640 x 200 pixel flat-panel liquid crystal display with an anti-glare coating. The LCD panel is mounted with an adjustable tilt angle of 90 to 180 degrees for optimum viewing. The display contains all driver circuits and interfaces with the main board through a cable.

DC-to-DC Converter Card — The internal DC-to-DC converter modifies the input voltage to supply the following outputs: +5 VDC, +10 VDC, -22 VDC for the LCD display and electroluminescent back panel, and -10 VDC for the system's internal components and subassemblies.

Brightness/Contrast Card — Two slide potentiometers on this card allow adjustment of contrast and backlight intensity of the LCD display.

LED Display Card — There are seven LEDs on this card. They indicate the status of the silicon disk drive, the floppy or hard disk drive, the keyboard, and the power source. The LED display card connects to the main board.

Disk Drives — The ZL-1 and ZL-2 computers have a built-in 2-inch floppy disk drive (720K), a ROM silicon disk drive, and a RAM silicon disk drive (no hard disk drive). The ZL-1-H and ZL-2-H have a built-in 20M hard disk drive, a ROM silicon disk drive, and a RAM silicon disk drive (no internal floppy disk drive). MS-DOS® drive designations are listed in the following table.

Table 1-1. *MS-DOS Drive Designations*

DRIVE DESIGNATION	ZL-1/ZL-2 DRIVES	ZL-1-H/ZL-2-H DRIVES
A	Internal floppy disk[1]	External floppy disk[2]
B	External floppy disk[1]	Not supported
C	ROM silicon disk[3]	Internal hard disk
D	RAM silicon disk[4]	ROM silicon disk[3]
E	Not supported	RAM silicon disk[4]

NOTES

1. These designations may be changed in the Monitor Setup program.
2. Connects to computer through back panel connector EXT FDD.
3. Read-only drive with subset of MS-DOS and FastLynx/LX™ transfer utility installed by manufacturer.
4. Read/write drive. To save data, RAM must be enabled in the Monitor Setup program.

Keyboard — The 80-key keyboard maintains 101-key keyboard AT-compatibility by using mode switching and multiple keys to duplicate keypad and special function key operation. The computer owner's manual describes keyboard operation in detail.

AC-to-DC Adapter — The adapter supplies DC voltage to the DC-to-DC converter card and is also used to charge the Ni-Cad battery pack.

Batteries — The Ni-Cad battery pack is used to power the computer when it is not connected to AC. When the computer is powered down, the Ni-Cad battery pack provides backup power for the real-time clock, the configuration information stored by the Setup program, and if enabled, the RAM silicon disk. The connector for AC power is contained in this battery pack. Two lithium batteries provide backup power to maintain date, time, and configuration information when neither battery pack nor AC power is available. The lithium batteries also provide backup power for the RAM silicon disk, when it is enabled.

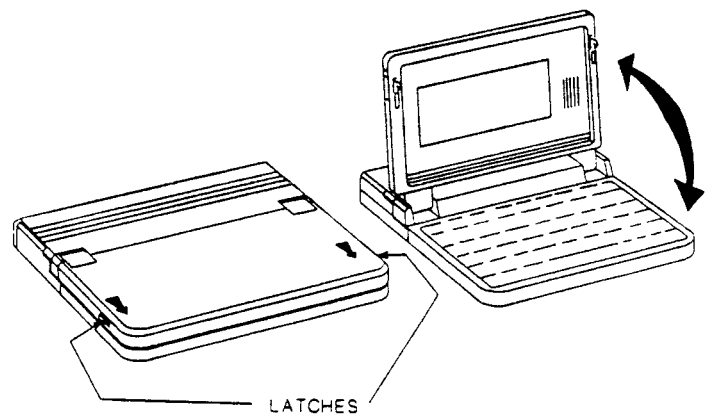
Operation

This section covers powerup, basic operating information, and a brief description of the Monitor program. Refer to the computer owner's manual for complete operating instructions.

Powerup

1. Refer to Figure 1-2. Slide the two latches toward the front of the computer. The top releases from the keyboard section.

Figure 1-2. *Opening the Case*



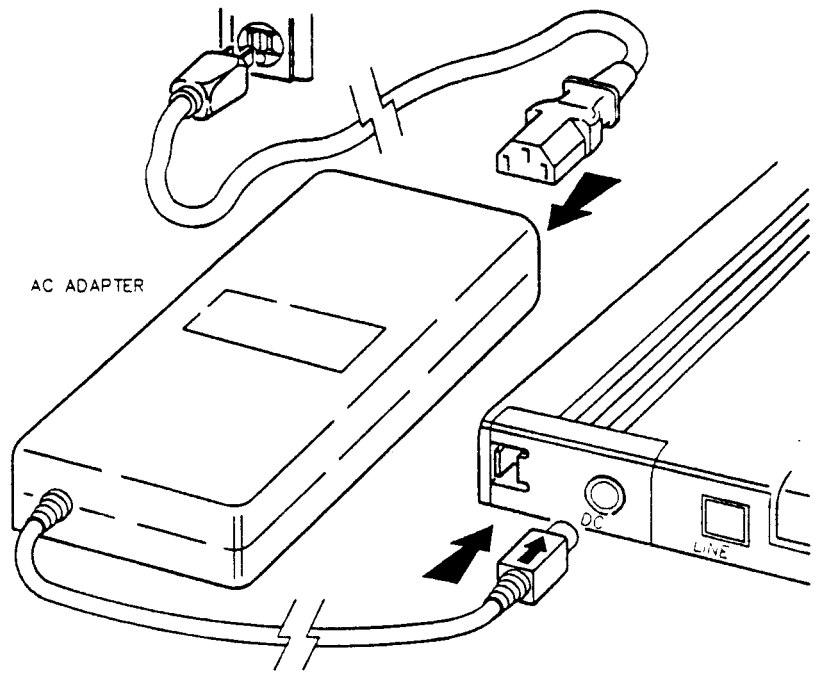
2. Connect the power cord to the AC adapter, as shown in Figure 1-3.

3. Connect the power cord to a grounded AC power source (120 or 240 volts AC, 50 to 60 Hz). Use the correct power cord for the power source.

4. Connect the AC adapter's DC cable into the jack marked "DC" on the left side of the computer. Make sure the arrow on the connector is facing up as shown in the illustration.

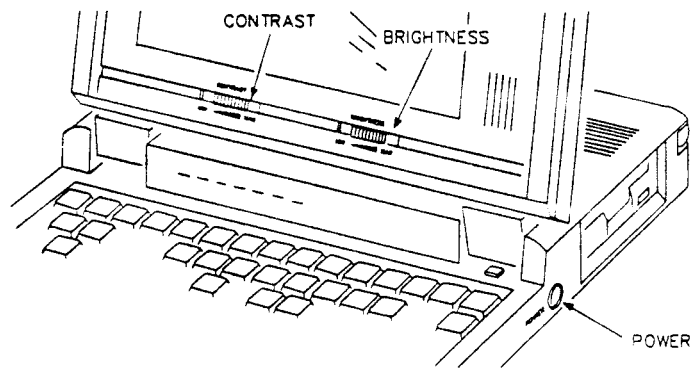
Notice: Whenever you disconnect the AC adapter's DC cable from the computer, pull on the connector, not the cable. The connector is spring-loaded and latches into the DC jack on the computer. This keeps the connector from being knocked loose.

Figure 1-3. *Powerup*



5. To power up the computer, press the button on the right side of the computer, shown in Figure 1-4, until the LCD display lights up. This button operates a momentary contact switch.

Figure 1-4. *Turning On the Power*



When the computer is turned on, it checks the major circuits to verify operation. If the computer fails a test, it attempts to display an error message. Chapter 4 describes these messages.

In addition to the self-tests at powerup, the LEDs under the screen light. The LEDs are shown in Figure 1-5 and described in Table 1-2. The boot (or autoboot) procedure depends on the parameters specified in the Setup program.

Figure 1-5. *Status LEDs*

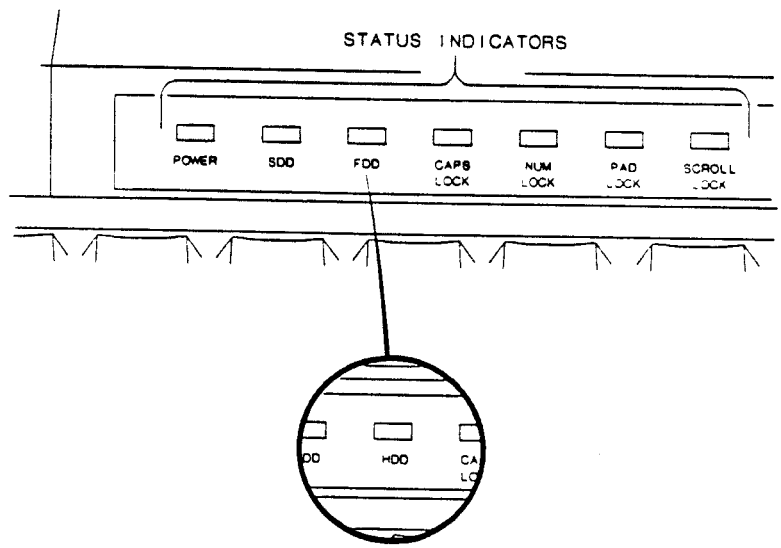


Table 1-2. *Status Indicators*

INDICATOR	DESCRIPTION
POWER	Glows amber when an external power adapter is connected. Glows green when operating from the battery pack. Flashes red when battery pack is near the end of its duty cycle.
SDD	Lights when the computer is accessing either silicon disk drive.
FDD[1]	Lights when the computer is accessing the floppy disk drive or the external floppy disk drive.
HDD[2]	Lights when the computer is accessing the hard disk drive.
CAPS LOCK	Lights when CAPS LOCK is active.
NUM LOCK	Lights when NUM LOCK is active.
PAD LOCK	Lights when PAD LOCK is active.
SCROLL LOCK	Lights when SCROLL LOCK is active (rarely used).

NOTES

1. Built-in floppy disk drive models only.
2. Built-in hard disk drive models only.

Computer Reset

There are four different ways to reset the computer.

1. Press and hold the CTRL, ALT, and DEL keys, then release them.

   This is referred to as a software reset. It resets the CPU, reinitializes the computer, and initiates the autoboot sequence.

2. Press and hold the CTRL, ALT, and INS keys, then release them.

   This is also referred to as a software reset. It resets the CPU, reinitializes the computer, and enters the Monitor program.

3. Turn the computer off, wait 30 seconds, and then turn it back on.

   This is a hardware reset. All circuits are reset to the power-on state.

4. Turn the computer off. Remove the Ni-Cad battery and the lithium backup batteries. Wait 10 minutes before reinstalling the batteries and turning on the computer.

   This is a hardware reset. All circuits are reset to the power-on state, and the memory is cleared.

The Monitor Program

The MFM-180 Monitor program contains:

- Power-up tests to detect problems that would prevent additional tests or an operating system from loading.
- The boot commands to load the operating system into memory from any drive.
- Tests to check the disk drives, keyboard, and memory.
- A color bar generator that lets you adjust colors on an external RGB monitor.
- Machine language commands so experienced programmers can enter, modify, and test machine-language code.
- The Setup program for setting computer operating parameters, and time and date for the real-time clock.
- The Setup/Configuration program (commonly called the Setup program) to store hardware configuration information.

There are two ways to enter the Monitor program.

1. Press and hold the CTRL, ALT, and INS keys, and then release them.

   A message similar to the following appears:

   ```
   MFM-180 Monitor, Version x.x
   Memory size: xxxK
   Enter "?" for help

   ->
   ```

   The first line indicates the ROM version. The second line indicates how much memory is installed. The third line gives the syntax for the help command.

2. Press and hold the CTRL, ALT, and ENTER keys, and then release them.

Figure 1-6 lists the Monitor command summary and syntaxes. For more information on the Monitor program commands, refer to the computer owner's manual.

Figure 1-6. *Monitor Command Summary*

```
                    - MFM-188 Command Summary -

CMD:    Explanation             Syntax
---     -----------             ------
?:      Help                    ?
B:      Boot from disk          B [{0|1|2|3}]
C:      Color Bar               C
D:      Display memory          D [<range>]
E:      Examine memory          E <addr>
F:      Fill memory             F <range>,{<byte>|"<string>"}...
G:      Execute (Go)            G [=<addr>][,<breakpoint>]...
H:      Hex math                H <number1>,<number2>
I:      Input from port         I <port>
M:      Move memory block       M <range>,<dest>
O:      Output to port          O <port>,<value>
R:      Examine Registers       R [<register>]
S:      Search memory           S <range>,{<byte>|"<string>"}...
T:      Trace program           T [<count>]
U:      Unassemble program      U [<range>]
V:      Set Video/Scroll        V [M<mode>][S<scroll>]
        Where <range> is:       <addr>{,:addr>|L<length>}
TEST:   Extended diagnostics    TEST
SETUP:  Define hardware Setup   SETUP
         Copyright (C) 1987, by Zenith Data Systems
->_
```

Boot Command

At the Monitor prompt (->), the boot command lets you manually boot an operating system from one of the computer's disk drives. The boot command syntax, as listed in the Monitor Command Summary, is:

```
B[{0|1|2|3}]
```

The following table lists boot commands. The F in the boot command syntax denotes a floppy disk drive, and the W denotes a winchester (hard disk) drive.

Table 1-3. *Monitor Boot Commands*

BOOT COMMAND SYNTAX	ZL-1/ZL-2 DRIVES	ZL-1-H/ZL-2-H DRIVES
BF0	Internal floppy disk	External floppy disk
BF1	External floppy disk	Not supported[1]
BF2, BF3[1]		
BW0	ROM silicon disk	Internal hard disk
BW1	RAM silicon disk 1	ROM silicon disk 0
BW2	Not supported	RAM silicon disk 1

NOTE

1. These commands, although part of the MFM-180 Monitor program, are not supported in this computer.

ROM-Based Tests

The Monitor program contains four tests. To access the test menu, type TEST at the Monitor prompt and press ENTER. The following menu appears:

```
CHOOSE ONE OF THE FOLLOWING:

1. DISK READ TEST
2. KEYBOARD TEST
3. MEMORY TEST
4. POWER-UP TEST
5. EXIT

ENTER YOUR CHOICE.
```

To run a test, type the number that corresponds to the test. With the exception of the keyboard test, each test continues to run until an error is detected or the test is halted.

To stop a test, press the ESC key. Press the ESC key again and the test menu reappears on the screen, where you can select another test, or press 5 to return to the Monitor prompt.

With the exception of the keyboard test, the screen clears and displays the test name in the upper left-hand corner of the screen. In the center, the program reports the number of times the test has run (TEST COUNT). If an error is detected during the test, information about the error appears on the display.

Disk Read Test — This test continually reads the first sector of track 0 on the default drive. To change the drive under test, manually boot from the drive you want to test.

Successful completion of this test indicates the drive can read the disk. If the computer still fails to boot, problems could exist with memory or related circuits.

Keyboard Test — This test checks the operation of most keys on the keyboard. The following keys are not tested:

- PRT SC (print screen)
- SCROLL LOCK
- PAUSE
- CAPS LOCK
- SHIFT
- CTRL (control)
- ALT (alternate)
- NUM LOCK (number lock)
- FN (function).

Other entries display a key character code, and with the exception of the following, an ASCII character or symbol:

Space bar (displays spaces)
Arrow keys
F1 through F12 function keys
Insert
Delete.

Memory Test — This test performs a fast march algorithm on all memory. While the test is running, a series of beeps can be heard.

Power-Up Test — This test continuously repeats some of the power-up tests used during startup and checks the following: the CPU, the ROM, and timer interrupt.

Chapter 2
Installation

This chapter provides instructions for setting up the computer, installing internal options, and connecting peripherals.

Unpacking the Computer

Caution: Avoid shock hazards. Do not connect power or turn the computer on until instructed to do so.

1. Unpack the user documentation and the operating system, set them aside until they are called for.
2. Choose a sturdy work location away from heat sources such as heaters or radiators.

   Note: Refer to the "Specifications" section for recommended operating conditions.
3. Avoid lights or windows that can cause reflections on the display or monitor.

Notice: Handle the computer with care to prevent damage. Do not drop or jar the hard disk drive (if present).

4. Carefully unpack the computer.
5. Place the computer and any peripheral equipment on the work surface. Make certain there is unobstructed air space around the top, sides, and rear of the computer. These areas must be accessible during setup and options installation.
6. Have the customer save all shipping cartons and inserts in case they must transport the computer.

Setup

The following sections detail steps for setting up the computer for portable or desktop operation. Refer to the appropriate section for your installation.

If you need to install any options, do so now. Refer to "Installation of Options" later in this chapter.

Portable Operation

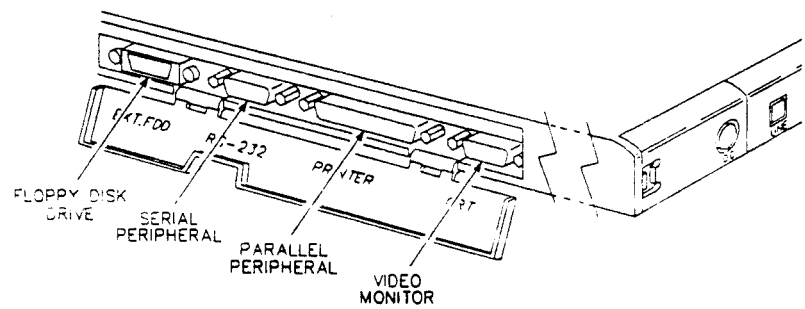
Before the customer uses the computer, he/she must "season" the battery. Depending on the battery model, a properly seasoned battery provides up to three hours of reliable portable power. To season the battery, have the customer complete the following steps:

1. With the computer off, charge the new battery pack for ten hours.
2. Allow the computer to run until the power indicator flashes, indicating a depleted battery pack.
3. Recharge the battery pack for three hours.

Desktop Operation

1. Determine which peripherals to connect to the computer.
2. Refer to Figure 2-1 and connect the peripheral(s).

Figure 2-1. *Rear Panel Peripheral Connectors*



3. Make certain all cables are fastened properly.

Refer to the "Specifications" section for connector pinout information.

The computer provides an external 9-pin D-type connector for an RGB monitor.

While operating with AC power, check the color of the power LED:

- AMBER — The computer is operating under AC power and the battery pack is charging.
- RED or GREEN — The Computer is operating under battery power. Check the power cube connection.

Installation of Options

The following sections describe how to install options. Refer to the appropriate section and follow the steps.

Static Precautions

Use the following procedures when handling circuit boards or integrated circuits (ICs):

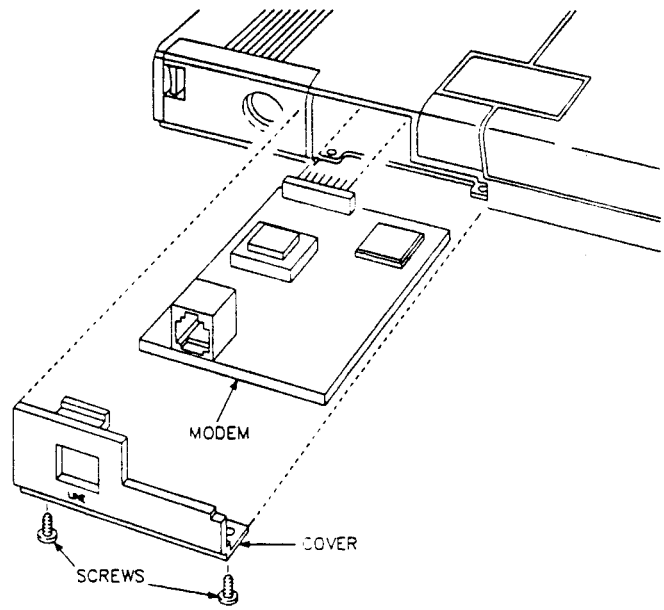
- Do not remove any static-sensitive device from its protective packaging until you are ready to install it.
- Equalize the static electricity between the work surface, the device, and you by touching the work surface with one hand and then picking up the device with the other hand.
- Once you remove the device from its protective packaging, do not set it down or let go of it until it is either installed in the computer or returned to its protective packaging.

Modem Card

Notice: Use static precautions.

1. Remove the modem cover, as described in Chapter 3 under "Modem."
2. Slide the modem card into the computer, as shown in Figure 2-2.
3. Remove the plug from the hole labeled "LINE" in the modem cover.

Figure 2-2. *Installing a Modem Card*



4. Replace the modem cover.
5. Use the modem to verify proper installation.
6. Enter the new configuration information in the Monitor Setup program.
7. Update the Setup Record in the owner's manual.

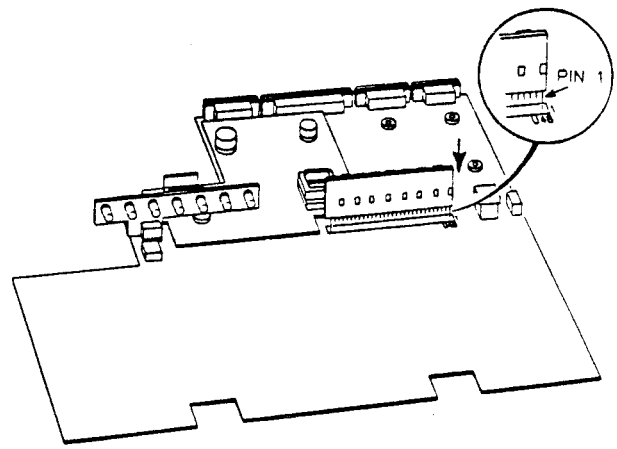
One-Megabyte Memory Module

Notice: Use static precautions.

1. Remove the main board, as described in Chapter 3 under "Main Board."

2. Install the memory module in the main board as shown in Figure 2-3. Position pin 1 as shown.

Figure 2-3. *Installing a Memory Module*



3. Solder the leads of the memory module on the component side of the main board.

4. Replace the main board and reassemble the computer.

5. Run the ROM-based memory test described in Chapter 4 and verify that the memory banks are functioning properly.

6. Run the disk-based memory diagnostic tests to thoroughly check the new memory. Refer to the Disk-Based Diagnostics Manual for testing instructions.

7. Update the memory size in the Monitor Setup program. If you are unfamiliar with the procedure, refer to the computer owner's manual.

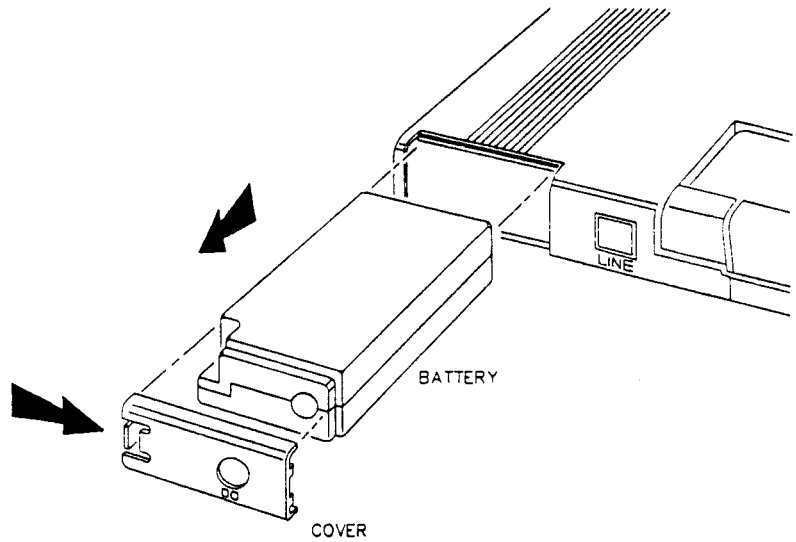
8. Update the Setup Record in the owner's manual.

Battery Replacement

Ni-Cad Battery Pack

1. Push the tab, as shown in Figure 2-4, and remove the cover.
2. Pull the battery pack out.

Figure 2-4. *Removing the Battery Pack*



Note: When you install a new battery pack, follow the steps for seasoning listed earlier in this chapter.

Lithium Batteries

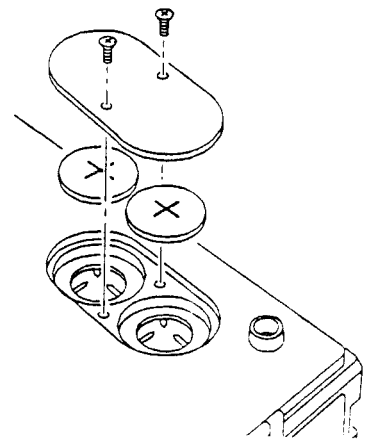
Caution: To prevent explosion hazards, do not crush, incinerate, expose to water, or attempt to recharge the lithium battery.

1. Place the computer topside down on a soft, clean surface and remove the screws as shown in Figure 2-5.

2. Remove the batteries from the computer, taking care not to bend the connectors.

Notice: When you replace the back-up batteries, place the positive-side up to prevent damage to the batteries and the computer.

Figure 2-5. *Replacing Lithium Batteries*



Chapter 3

Disassembly

This chapter contains step-by-step instructions for disassembly. For reassembly, reverse the process of the steps unless instructed otherwise. Read each section completely before disassembling the computer.

Static Precautions

When handling circuit cards, circuit boards, disk drives, or integrated circuits (ICs):

- Do not remove any static-sensitive device from its protective packaging until you are ready to install it.
- Equalize the static electricity between the work surface, the device, and you, by touching the work surface with one hand and then picking up the device with the other hand.
- Once you remove the device from its protective packaging, do not set it down or let go of it until it is installed in the computer or returned to its protective packaging.

Caution: To avoid shock hazard:

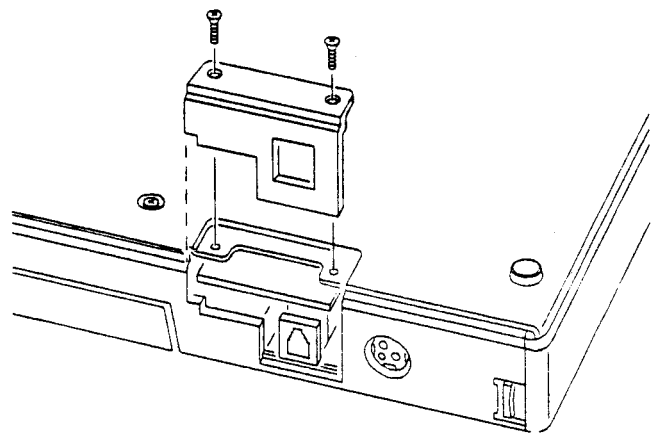
- Make sure the power switch is OFF.
- Disconnect the external AC adapter.
- Remove the Ni-Cad battery pack.
- Disconnect and remove all external cables, including those that connect to telephones, telephone lines, and peripherals.

Modem

Notice: Use static precautions.

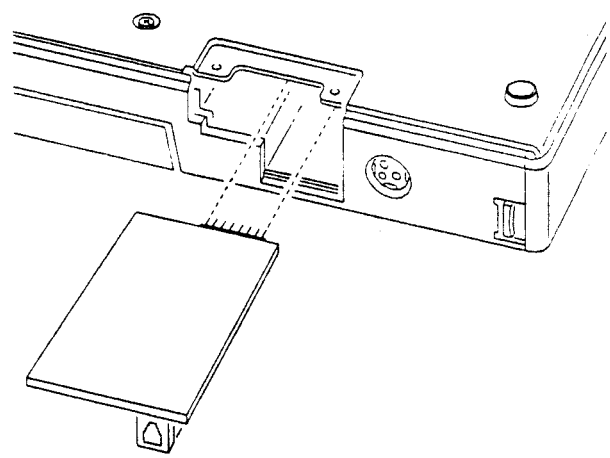
1. Remove the screws from the modem cover, as shown in Figure 3-1, and lift off the cover.

Figure 3-1. *Removing the Modem Cover*



2. Pull the modem card from the computer as shown in Figure 3-2.
3. Place the card in protective packaging.

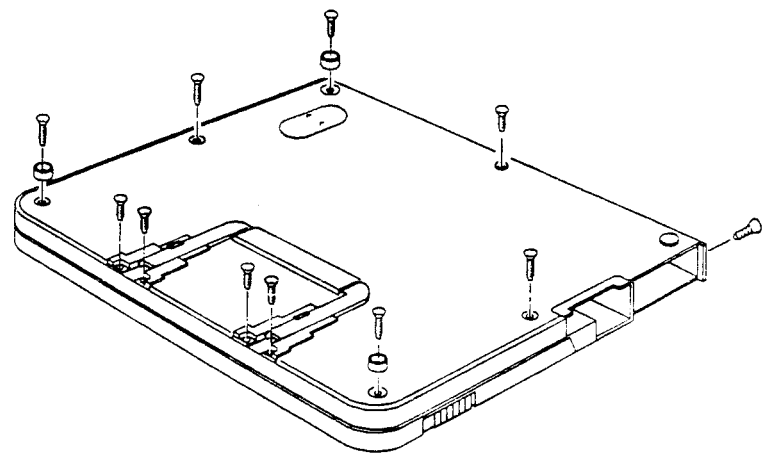
Figure 3-2. *Removing the Modem Card*



Case Bottom

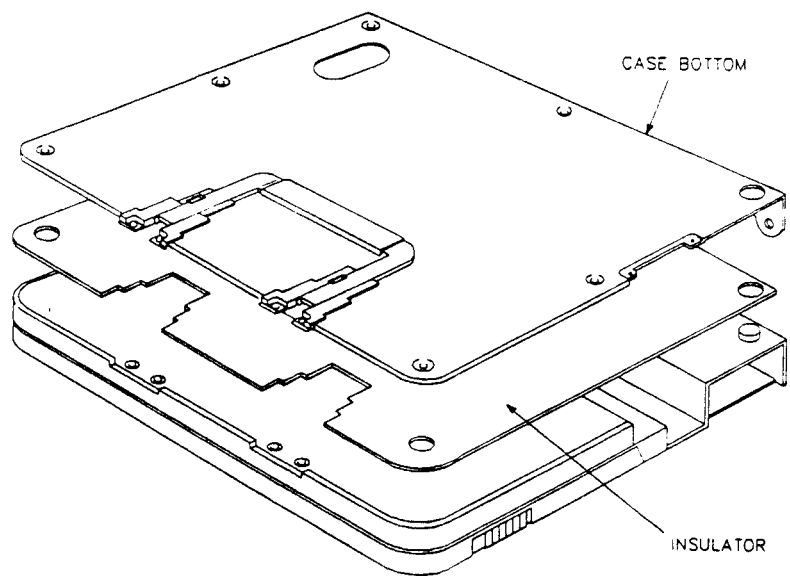
1. Remove the modem cover, as previously described.
2. Remove the screws, as shown in Figure 3-3.

Figure 3-3. *Removing Screws from the Case Bottom*



3. Remove the case bottom and insulator, as shown in Figure 3-4. (The insulator may be attached to the bottom.)

Figure 3-4. *Removing the Case Bottom and Insulator*



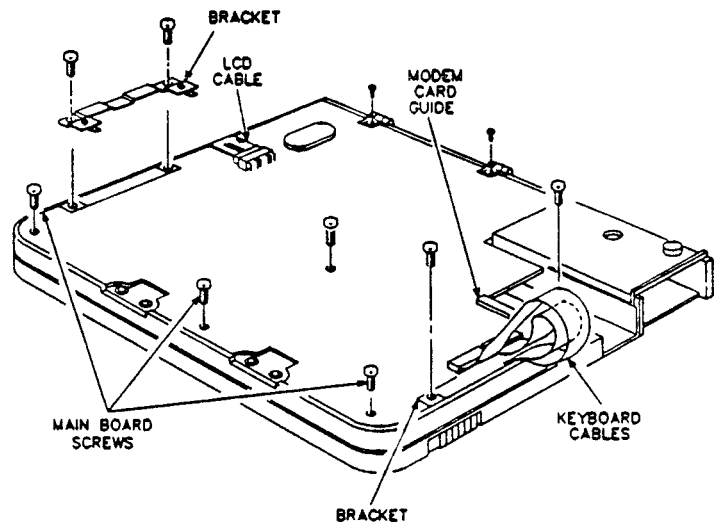
Main Board

Notice: Use static precautions.

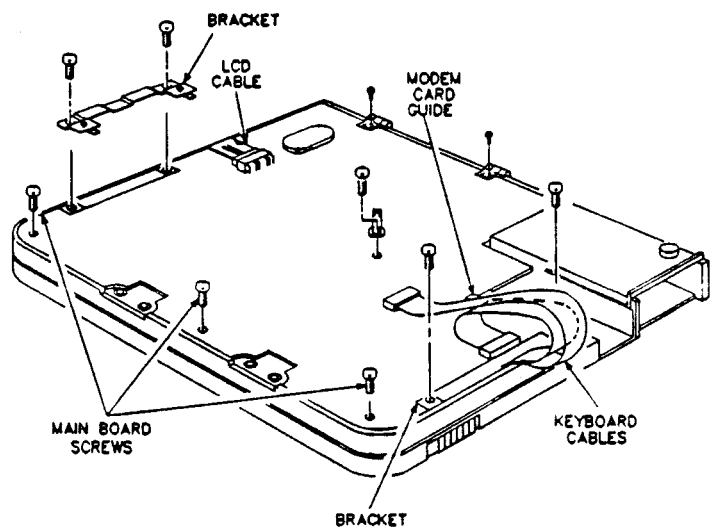
1. Disconnect the keyboard cables and LCD cable, as shown in Figure 3-5.
2. Remove the main board screws, as shown in Figure 3-5.
3. Remove the screws and brackets from the sides of the main board. disconnect the grounding lug, if present.

Figure 3-5. *Disconnecting the Main Board*

FLOPPY DRIVE MODEL

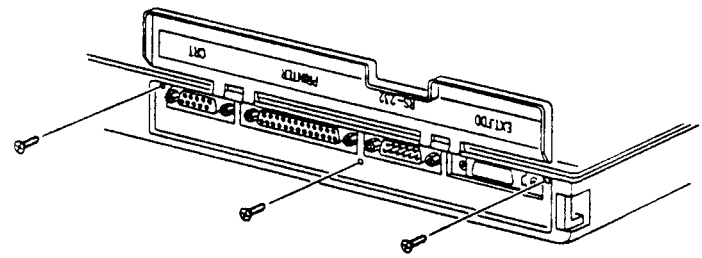


HARD DRIVE MODEL



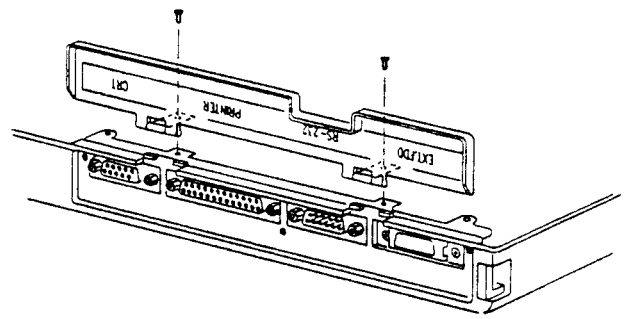
4. Remove the screws, as shown in Figure 3-6.

Figure 3-6. *Removing the Screws from the Rear of the Unit*



5. Detach the I/O port cover, as shown in Figure 3-7.

Figure 3-7. *Detaching the I/O Port Cover*

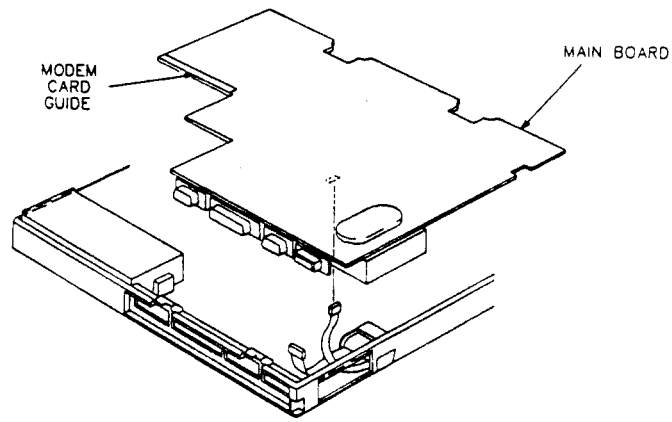


6. Gently push in at the rear of the unit and lift the board from the front.

7. Disconnect the four-conductor cable from the main board, as shown in Figure 3-8.

Note: The modem card guide is attached the main board; do not lose it.

Figure 3-8. *Removing the Main Board*



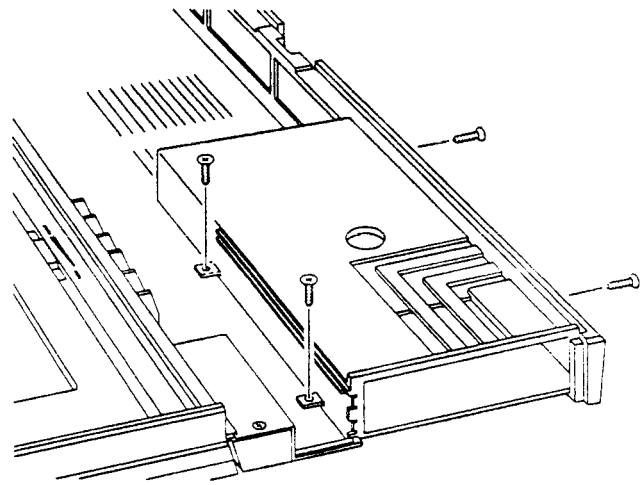
8. Desolder the black, red, and yellow wires (that come from the battery box) on the component side of the main board.

9. Place the board in protective packaging.

Battery Box

1. Remove the screws, as shown in Figure 3-9.
2. Remove the battery box.
3. Desolder from the main board (if necessary).

Figure 3-9. *Removing the Battery Box*

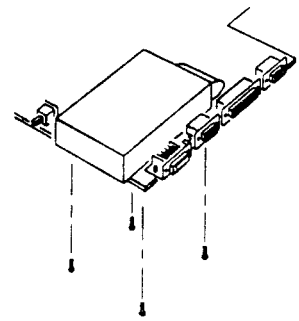


Disk Drive

Notice: Use static precautions.

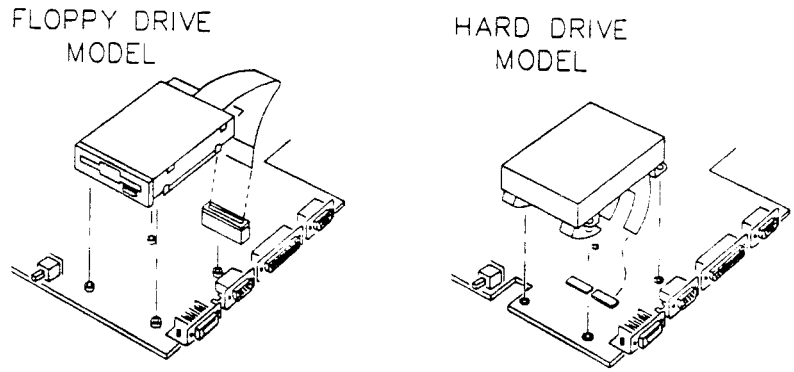
1. Remove the screws from the component side of the board, as shown in Figure 3-10.

Figure 3-10. *Removing the Drive*



2. Disconnect the disk drive cable from the main board, as shown in Figure 3-11.

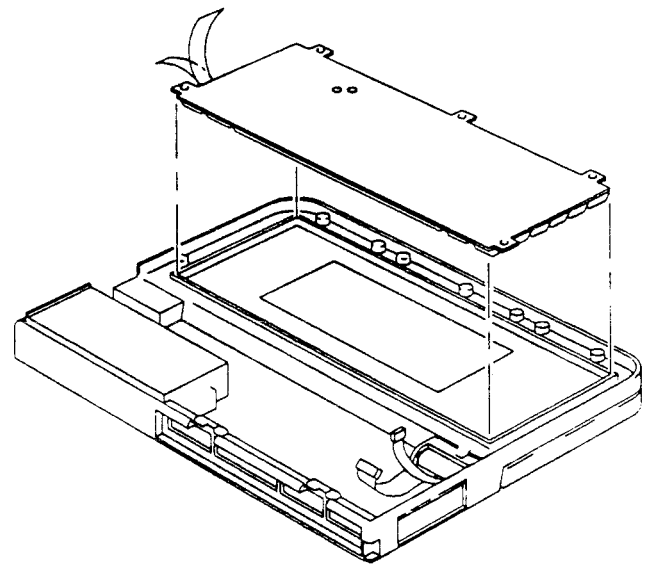
Figure 3-11. *Disconnecting the Disk Drive*



Keyboard

1. Lift the keyboard up and out of the computer, as shown in Figure 3-12.

Figure 3-12. *Removing the Keyboard*

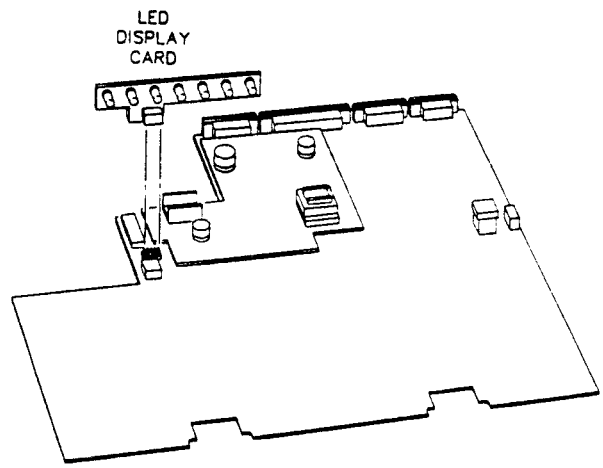


LED Display Card

Notice: Use static precautions.

1. Disconnect the LED display card, as shown in Figure 2-15.
2. Place the card in protective packaging.

Figure 2-15. Disconnecting the LED Display Card

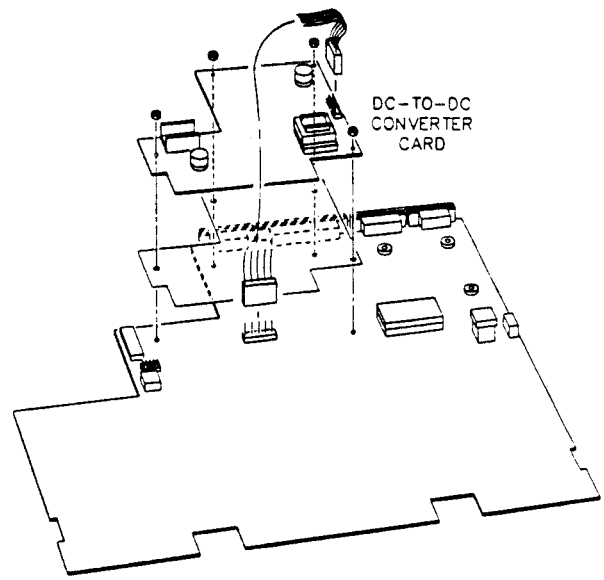


DC-to-DC Converter Card (Power Supply Card)

Notice: Use static precautions.

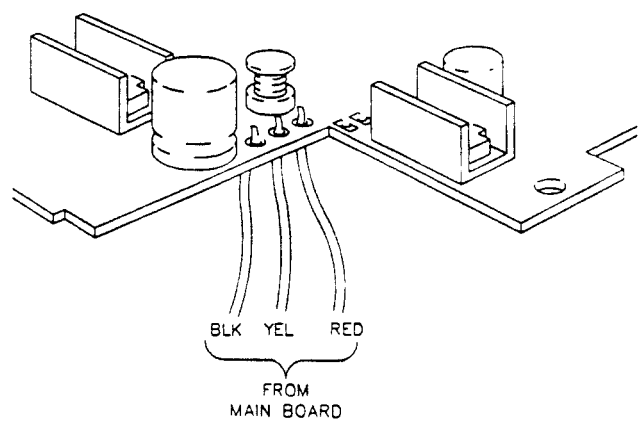
1. Remove the hex nuts from the component side of the DC-to-DC converter card, as shown in Figure 3-14.
2. Disconnect the cable on the DC-to-DC converter card.

Figure 3-14. *Removing the DC-to-DC Converter Card*



3. Desolder the black, red, and yellow wires on the foil side of the card, as shown in Figure 3-15. (Observe the location of each wire for proper reconnection.)
4. Lift off the card and insulator from the standoffs on the main board.
5. Place the card in protective packaging.

Figure 3-15. *Desoldering Wires*

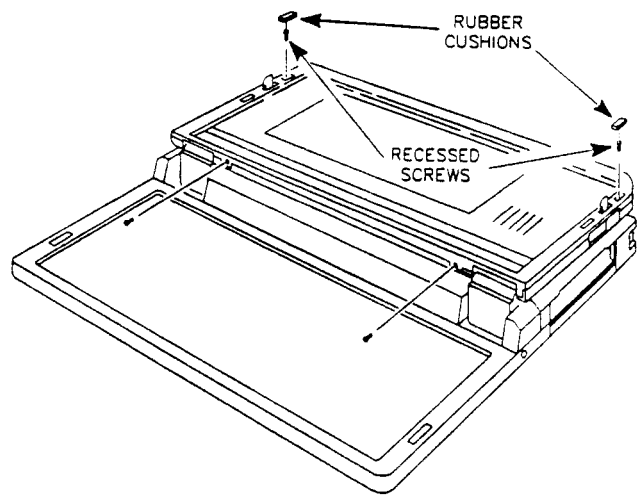


Top Assembly, Internal Floppy Disk Version

LCD Cover

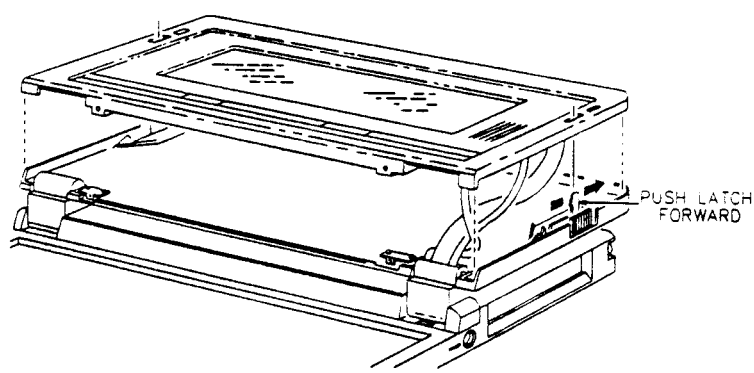
1. Tilt back the LCD display as far as possible, as shown in Figure 3-16, and remove the screws.
2. Remove the rubber cushions above the door latches.
3. Use a small phillips screwdriver and remove the recessed screws, as shown in Figure 3-16.

Figure 3-16. *Disassembling the LCD Cover (Floppy Drive Computer)*



4. Use a flat-bladed screwdriver to separate the two halves of the top cover.
5. Lower the top half of the cover and push the door latches forward to free it, as shown in Figure 3-17.

Figure 3-17. *Separating the LCD Cover (Floppy Drive Computer)*

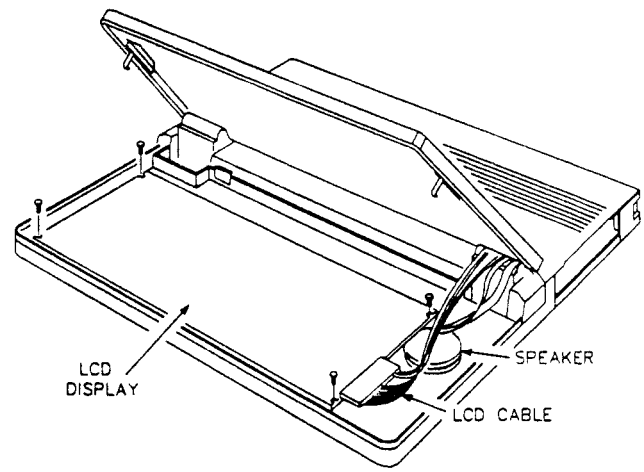


LCD Display

Notice: Use static precautions.

1. Remove the screws that secure the LCD display, as shown in Figure 3-18.
2. Disconnect the LCD cable assembly from the LCD card.
3. Desolder the black wires from the brightness/contrast card.
4. Place the LCD display in protective packaging.

Figure 3-18. *Removing the LCD Display (Floppy Drive Computer)*

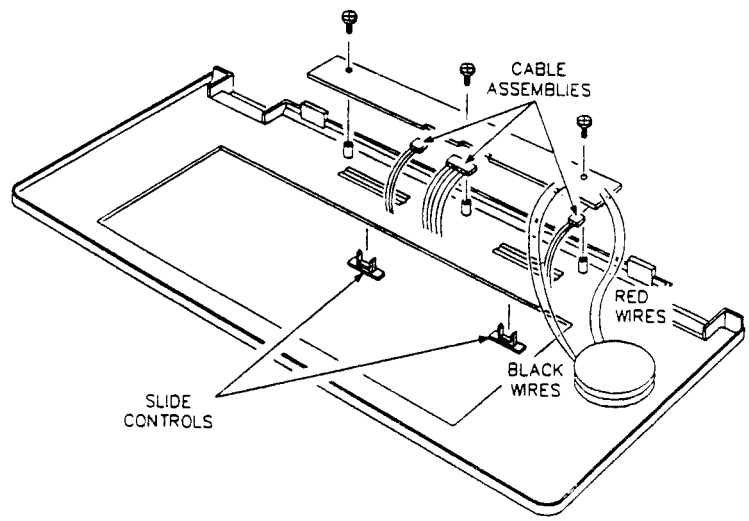


Brightness/Contrast Card

Notice: Use static precautions.

1. Remove the screws, as shown in Figure 3-19.
2. Desolder the red and black wires, as shown in Figure 3-19.
3. Disconnect the cable assemblies from the brightness/contrast card.
4. Remove the card. The brightness and contrast slide controls pop off. Be careful not to lose them or the plastic strip that they fit into.
5. Place the card in protective packaging.

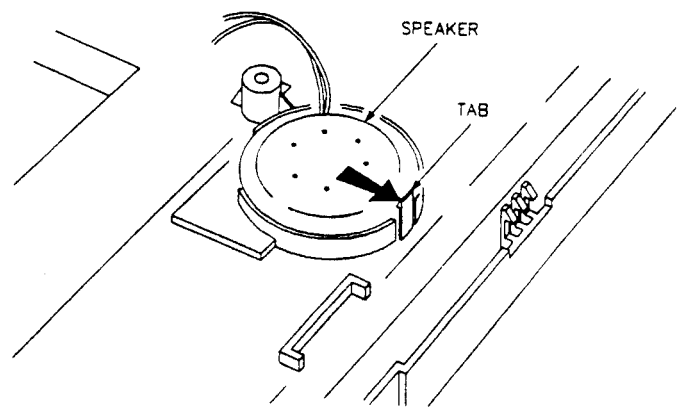
Figure 3-19. *Removing the Brightness/Contrast Card (Floppy Drive Computer)*



Speaker

1. Desolder the speaker wires on the brightness/contrast card.
2. Push on the tab, as shown in Figure 3-20, and remove the speaker.

Figure 3-20. *Removing the Speaker (Floppy Drive Computer)*

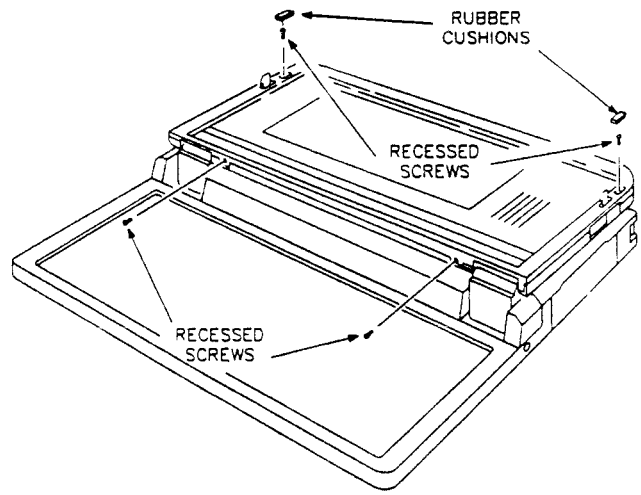


Top Assembly, Internal Hard Disk Version

LCD Cover

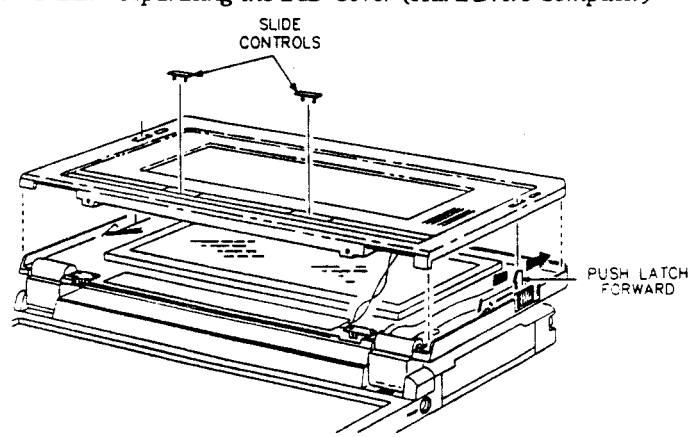
1. Tilt back the LCD display as far as possible, as shown in Figure 3-21, and remove the screws.
2. Remove the rubber cushions above the door latches.
3. Use a small phillips screwdriver and remove the recessed screws, as shown in Figure 3-21.

Figure 3-21. *Disassembling the LCD Cover (Hard Drive Computer)*



4. Use a flat-bladed screwdriver to separate the two halves of the cover.
5. Lower the top half of the cover and push the door latches forward to free it, as shown in Figure 3-22. The brightness and contrast slide controls pop off. Be careful not to lose them or the plastic strip that they fit into.

Figure 3-22. *Separating the LCD Cover (Hard Drive Computer)*

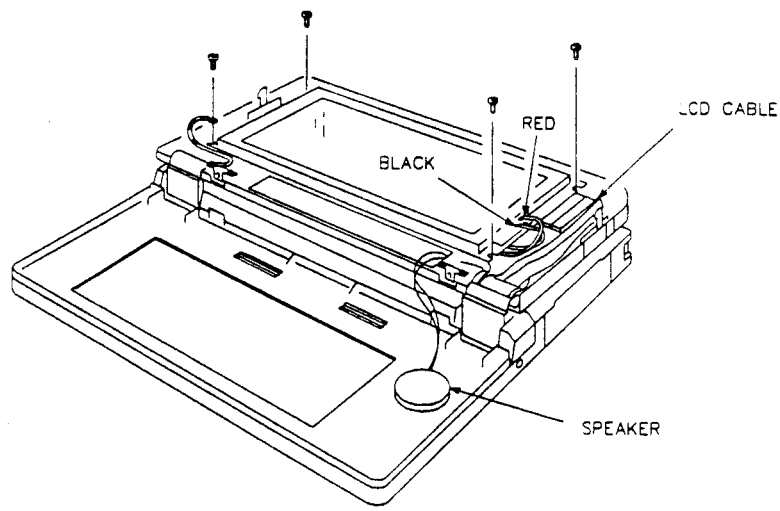


LCD Display

Notice: Use static precautions.

1. Remove the screws, as shown in Figure 3-23.
2. Disconnect the LCD cable, as shown in Figure 3-23.
3. Desolder the black and red wire. (Note their locations for proper reconnection).
4. Place the LCD display in protective packaging.

Figure 3-23. *Removing the LCD Display (Hard Drive Computer).*

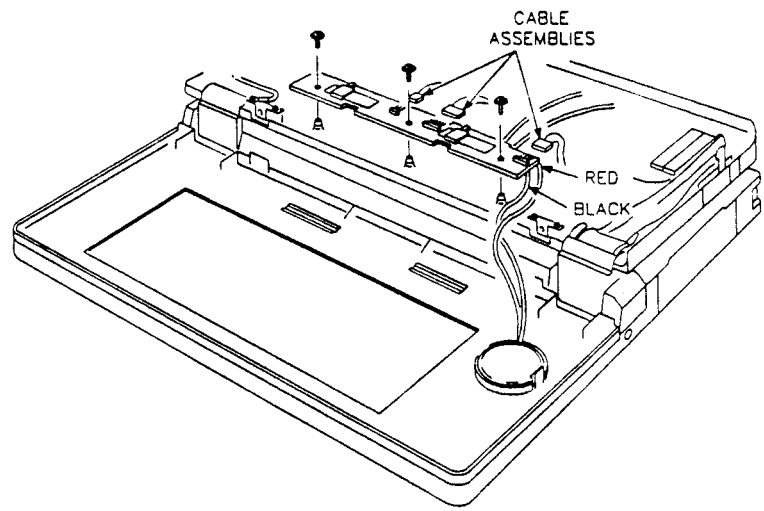


Brightness/Contrast Card

Notice: Use static precautions.

1. Remove the screws, as shown in Figure 3-24.
2. Disconnect the cable assemblies.
3. Remove the card from the computer.
4. Place the card in protective packaging.

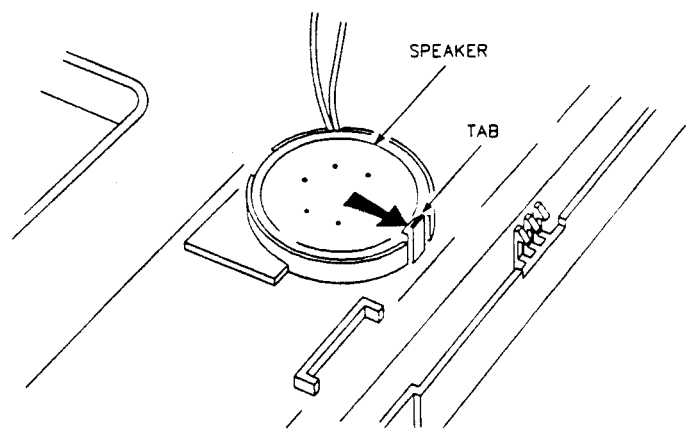
Figure 3-24. *Removing the Brightness/Contrast Card (Hard Drive Computer)*



Speaker

1. Desolder the two wires from the bottom of the brightness/contrast card.
2. Press the tab, as shown in Figure 3-25, to release the speaker.

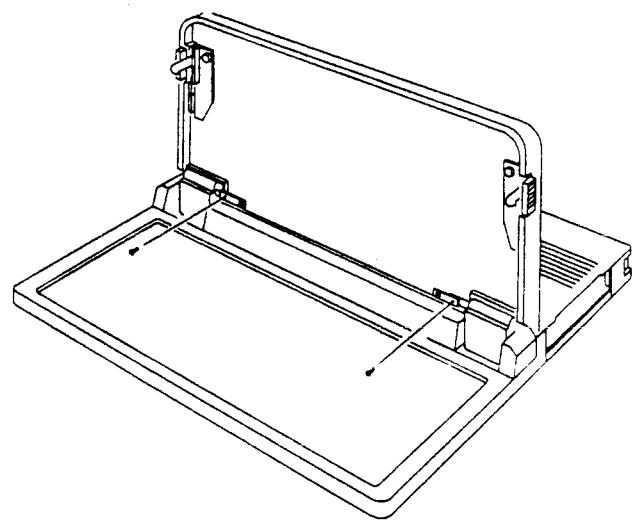
Figure 3-25. *Removing the Speaker (Hard Drive Computer)*



Hinge Assembly

1. Position the unit as shown in Figure 3-26. Remove the screw closest to the hinge block from each side.

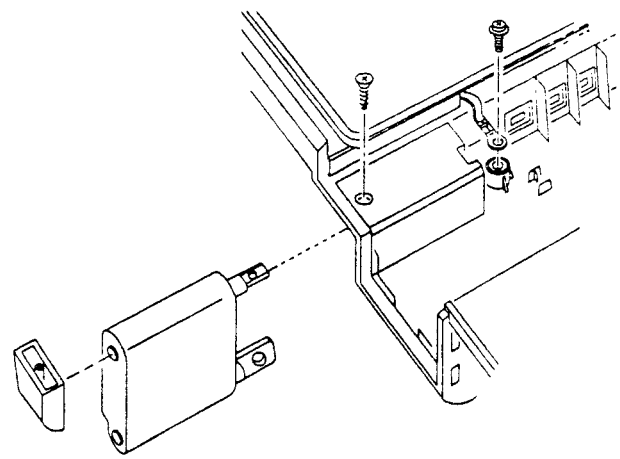
Figure 3-26. *Disassembling the Hinge*



2. Turn the computer over and remove the screws, as shown in Figure 3-27.

3. Remove the hinge assemblies.

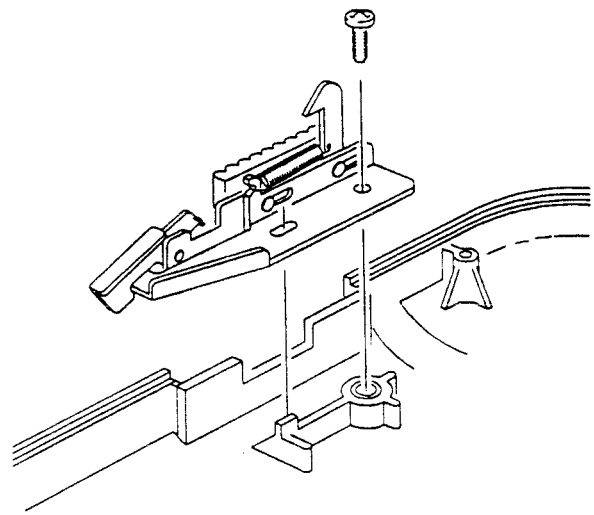
Figure 3-27. *Separating the Case*



Latch

1. Remove the screw from the latch, as shown in Figure 3-28.
2. Remove the latch.

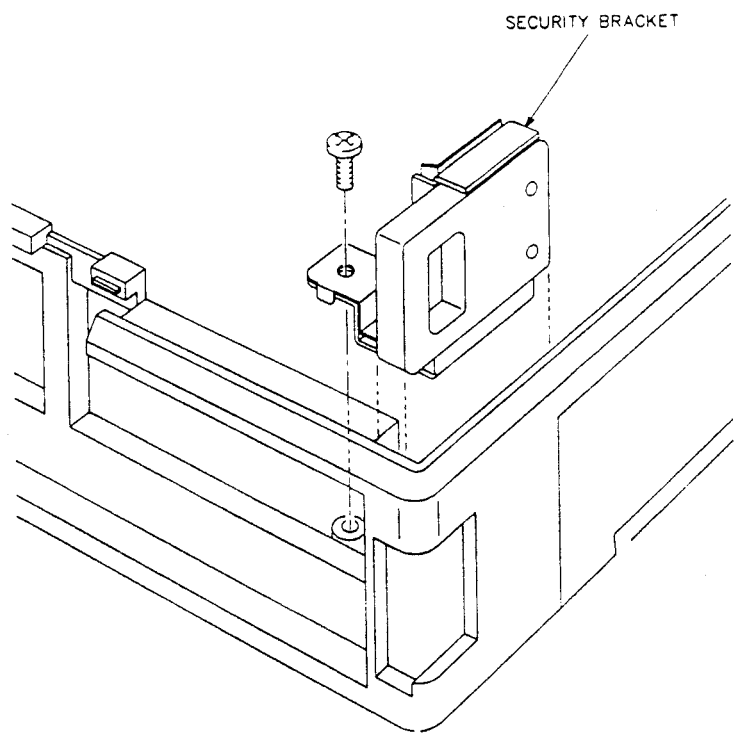
Figure 3-28. *Removing the Latch*



Security Bracket

1. Remove the screw from the bracket, as shown in Figure 3-29.
2. Slide out the bracket.

Figure 3-29. *Removing the Security Bracket*



Chapter 4

Troubleshooting

This chapter provides troubleshooting information to assist in diagnosing problems to the major assembly level.

Preliminary Checks

Before turning on the computer, open it, and inspect it for the following:

- Make a visual inspection. Replace any damaged parts.
- Check all cables for proper connection.
- Verify the external DC power supply and battery pack are functional.

Powerup

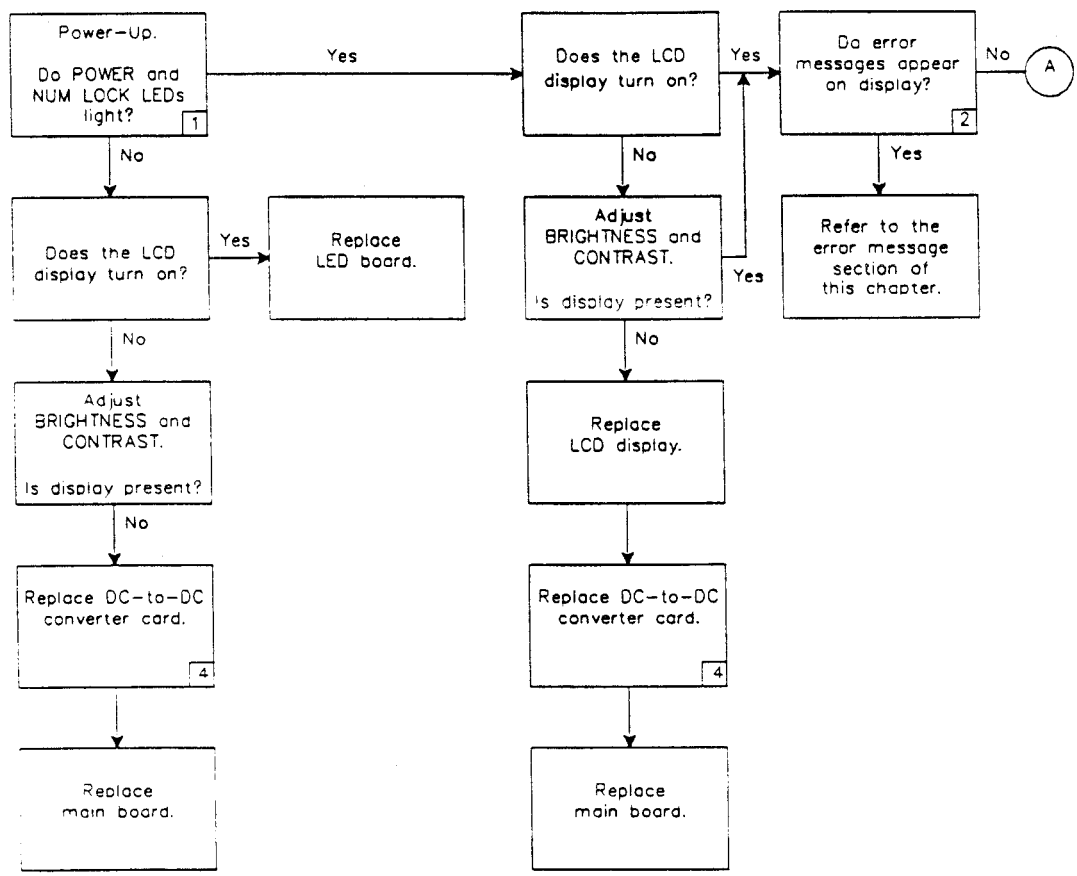
At powerup, the computer begins an initialization process to check internal circuits and components. If the computer encounters a problem during this process, an error message appears on the screen. (Refer to "Power-Up and Error Messages" later in this chapter.) The following events should occur when power is applied to the computer:

- LCD display lights up.
- POWER indicator lights up.
- NUM LOCK indicator lights up.
- A blinking cursor appears on the LCD display.
- After a short time, the computer boots the drive specified in the Monitor Setup program.

Troubleshooting Charts

Figure 4-1 through Figure 4-3 contains troubleshooting steps for this computer. This chart will direct you to replace a part. If the part does not correct the problem, proceed with part replacement until the problem is corrected.

Figure 4-1. *Troubleshooting Charts*



NOTES
1. The POWER LED is amber if the external ac adapter is used, green if only battery pack is used, and red if battery pack is low.
2. Check the Monitor Setup program to verify proper configuration.
3. Check the Monitor Setup program to verify autoboot selection.
4. Also referred to as power supply card.

Figure 4-2. *Troubleshooting Charts (Continued)*

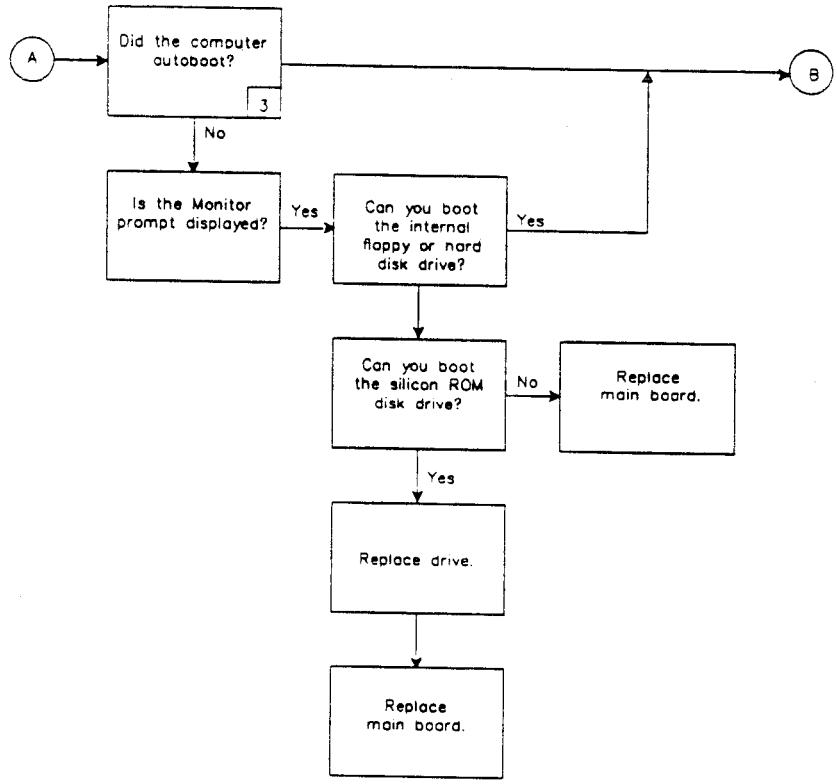
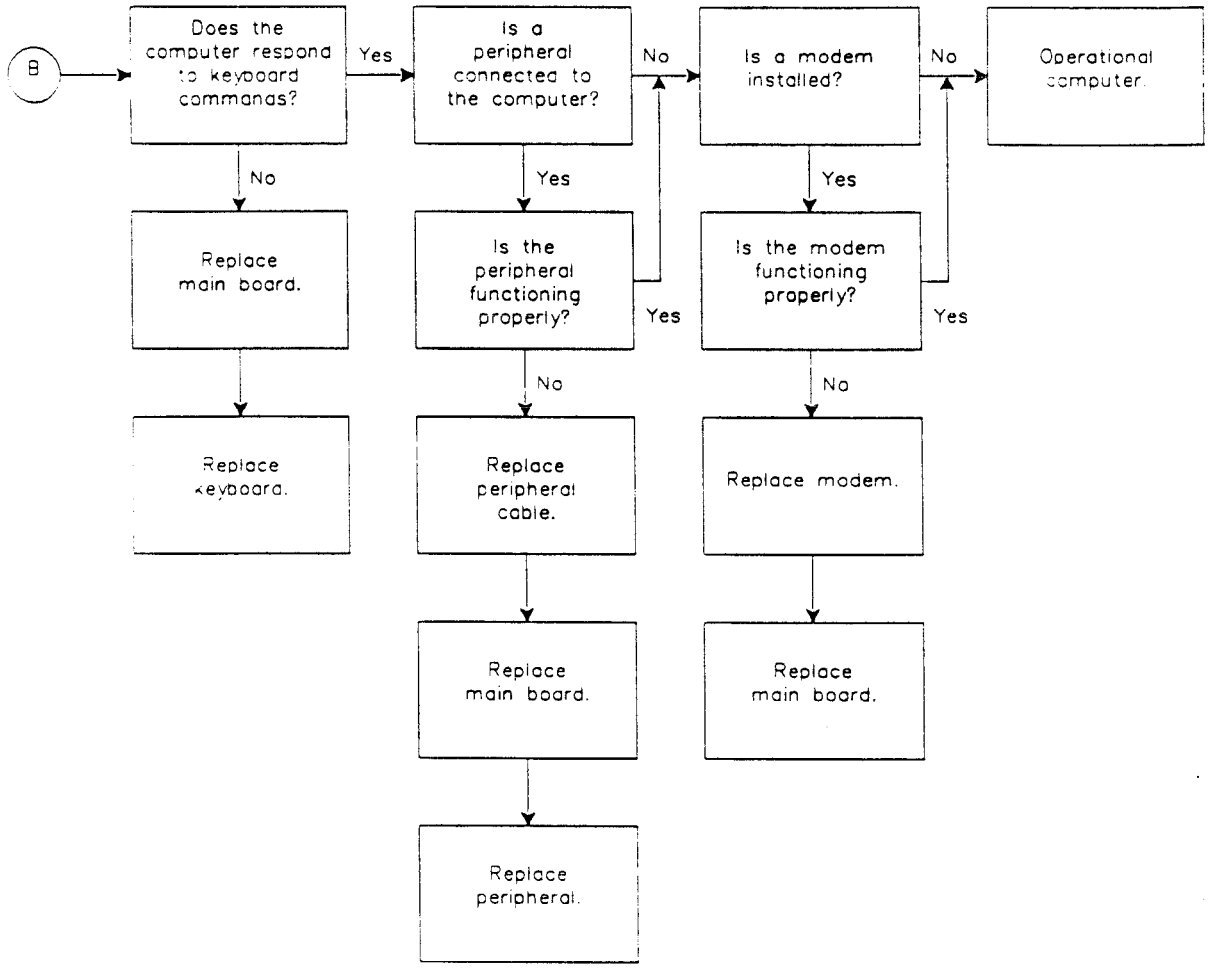


Figure 4-3. *Troubleshooting Chart (Continued)*



Disk-Based Diagnostics

An optional disk-based diagnostics package, model CB-31-07 is available for this computer. The disk-based diagnostics provide a more extensive and detailed series of tests for the computer.

Power-Up and Error Messages

If the computer encounters any problems during self-tests or power-up, it displays a message on the screen. The following section lists the error messages alphabetically, describes the probable cause(s), and lists the corrective action.

Bad configuration information found in CMOS!

This message is normal after lithium backup battery replacement or it could indicate a backup battery failure.

Corrective action:

- Re-enter the configuration information in the Monitor Setup program.
- Replace the backup lithium batteries and recharge the Ni-Cad battery pack.

Bad disk controller!

This message occurs if a disk drive cable is damaged or not securely connected, or if a hardware failure occurs.

Corrective action:

- Inspect the disk drive power and data cables for nicks or damage.
- Make certain all cables are properly connected.
- Use the ROM-based Disk Read Test to determine whether the disk drive or main board is at fault. Replace the failing unit.

CMOS Memory Failure!

The internal CMOS memory failed the power-up test.

Corrective action:

- Re-enter the configuration information in the Monitor Setup program.
- Replace the main board.

CPU failure!

The computer was turned off, and then on again very quickly, or the CPU or supporting circuitry may be defective.

Corrective action:

- Turn off the computer, wait for 30 seconds, and turn it back on again.
- Replace the main board.

CRC error!

This messages indicates a faulty disk, a hardware failure, or a loose or faulty drive cable.

Corrective action:

- Try using another disk. If the problem disappears, the disk is bad. Copy any readable files to a good disk and reformat the faulty disk. If bad sectors are reported, discard the disk.
- Replace the disk drive.
- Replace the main board.

Disk not bootable!

This message usually appears when an attempt is made to boot unformatted or non-MS-DOS disk.

Corrective action:

- Make certain that the disk is bootable. If not, reformat the disk and install the operating system, or try a different bootable disk.
- For a hard disk drive, try to reinstall the operating system. If necessary, backup the drive and use PREP to reinitialize the disk. Reformat the drive and install the operating system.
- Replace the faulty drive.
- Replace the main board.

Divide by zero!

Either the computer was turned off, and then on again very quickly, or a software failure occurred.

- Turn the computer off, wait 30 seconds, and turn it back on.
- Try another copy of the software.Unless this message occurs during the power-up sequence, the problem is likely to be the software. Have the customer contact the software manufacturer or dealer to report the problem.
- Replace the main board.

DMA overrun!

This message indicates a DMA-related hardware failure.

Corrective action:

- Replace the floppy disk drive.
- Replace the main board.

Drive not ready!

This message indicates either the disk is not fully inserted into the disk drive, or you are trying to access a drive that does not exist, or is not properly connected.

Corrective action:

- Fully insert the disk into the disk drive.
- Verify the drive is properly connected and is a valid drive.
- Replace the disk drive.
- Replace the main board.

EMS RAM failure!
ERROR: RAM Disk Failure!

These messages are normal after replacing the lithium batteries. They may also indicate a memory-related failure.

Corrective action:

- Use the Monitor Setup program to re-enter configuration information.
- Replace the main board.

Internal Stack Failure, System Halted!

An unexpected error or memory failure has occurred during program execution.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again. Run the program again.
- Try another copy of the software.
- Replace the main board.

Invalid address mark detected!

This message appears if the floppy or hard disk is damaged or has not been properly formatted.

Corrective action:

- Copy any readable files to another disk.
- If the problem is a floppy disk, two options are available:
  - Reformat the disk. If bad sectors are reported, discard the disk.
  - Replace the disk drive.
- If the problem is a hard disk, three options are available:
  - Reformat the hard drive.
  - Run PREP, then reformat the hard drive.
  - Replace the hard drive.

Invalid data read!

This message usually indicates an unformatted or damaged disk is being used.

Corrective action:

- Copy any readable files to another disk and format the faulty disk. If bad sectors are reported, discard the disk.
- Replace the drive.
- Replace the main board.

Invalid/No keyboard code received!

The computer does not recognize the keyboard input.

Corrective action:

- Replace the keyboard.
- Replace the main board.

Non-maskable interrupt

This message indicates a program execution error or a power supply interruption.

Corrective action:

- Try running the program again.
- Replace the main board.
- Replace the DC-to-DC converter card (power supply card).

Non-system
No system

The computer is attempting to boot an unformatted disk.

Corrective action:

- Try booting another disk.
- Replace the disk drive.
- Replace the main board.

Not a bootable partition

The computer attempted to boot an unformatted partition on the hard disk drive.

Corrective action:

- Check the boot command and make sure a valid partition was selected.
- Format the partition and install the operating system. Refer to the operating system documentation for instructions.

Overflow!

Either the computer was turned off, and then on again very quickly or a power-up test failed. The problem can also be software related.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again.
- Unless this message occurs during the power-up sequence, the problem is probably software related. Try another copy of the program or have the customer contact the software manufacturer or dealer to report the problem.
- Replace the main board.

Please replace the backup battery!
Bad configuration information found in CMOS!!

This message is normal after back-up battery replacement. It also can indicate a lithium battery failure.

Corrective action:

- If the battery was recently replaced, re-enter the configuration information in the Monitor Setup program.
- Replace the lithium batteries.
- Replace the main board.

RAM Disk Failure!

This message appears after the lithium backup batteries have been replaced. All data on the RAM disk has been lost.

Corrective action:

- Inspect the memory module for proper installation.
- Replace the main board.

RAM disk is being cleared.

This message appears when data on the RAM disk is corrupt.

Corrective action:

- Replace the lithium batteries.

RAM failure! Address: xxxx:yyyy, Bit:n

The power-up tests detected a memory failure.

Corrective action:

- Replace the main board.

ROM checksum failure!
ROM disk checksum is bad!

These messages may appear if the computer was turned off, and then on again very quickly. The message may indicate that one or more of the ROMs is not functioning correctly.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again.
- Replace the main board.

Sector not found!

This message usually indicates an unformatted or damaged disk is being used.

Corrective action:

- Copy any readable files to another disk.
- If the problem is a floppy disk, two options are available:
  - Reformat the disk. If bad sectors are reported, discard the disk.
  - Replace the drive.
- If the problem is a hard disk drive, three options are available:
  - Reformat the hard drive.
  - Run PREP, then reformat the hard drive.
  - Replace the hard disk drive.

Seek failure!

The computer attempted to access an unformatted or damaged floppy or hard disk drive.

Corrective action:

- Copy any readable files to another disk.
- If the problem is a floppy disk drive, two options are available:
  - Reformat the disk. If bad sectors are reported, discard the disk.
  - Replace the drive.
- If the problem is a hard disk, three options are available:
  - Reformat the hard drive.
  - Run PREP, then reformat the hard disk drive.
  - Replace the hard disk drive.
- Replace the main board.

System memory size incorrect!

This message indicates the actual installed memory does not match the memory specified in the Monitor Setup program.

Corrective action:

- Use the Monitor Setup program to re-enter memory configuration information.
- Replace the main board.

The back-up battery is low!

This message may appear if the insulating strip that prevents the lithium backup batteries from draining was not removed. The message may also indicate that the lithium backup batteries are drained.

Corrective action:

- Turn off the computer and remove the insulating strip.
- Replace the lithium backup batteries. If the lithium backup batteries were just replaced, press the ESC key. Use the Setup program to update the time and date information, if necessary.

Timer interrupt failure!

This message may appear if the computer was turned off, and then on again very quickly. The message may also indicate that the interrupt control or timer logic may have failed.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again. If the message reappears, replace the main board.

Wild hardware interrupt!

This message indicates that an unexpected error or memory failure occurred while running a program.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again. Run the program again. If the message reoccurs at the same place during the operation of a program, it may be software related. Have the customer report the problem to the software manufacturer or dealer.

- Replace the main board.

Wild interrupt!

This message means that an unexpected error or memory failure exists in the computer.

Corrective action:

- Turn off the computer, wait 30 seconds, and turn it on again. Run the program again. If the message reoccurs at the same place, it may be software related. Have the customer report the problem to the software manufacturer or dealer.

- If the message reoccurs randomly, use the disk-based diagnostic tests to test the computer.

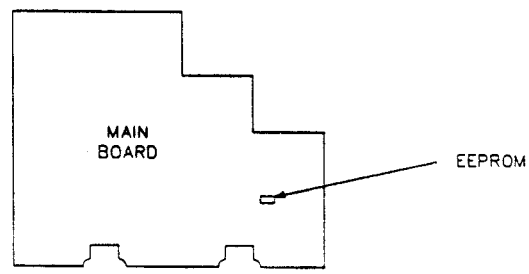
- Replace the main board.

Disabling an Unknown Password

1. Remove the modem cover and case bottom as described in Chapter 3.

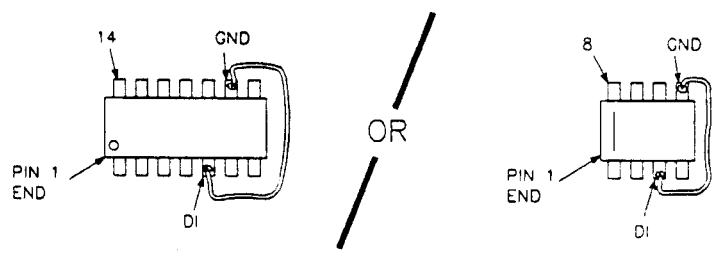
2. Use Figure 4-4 to find the general location of the EEPROM component, a 93C46 on the main board. Depending on the computer model, it may be either an 8-pin or a 14-pin IC.

Figure 4-4. *Locating the EEPROM*



3. Solder a wire between the data-in pin and the ground pin. Figure 4-5 shows the locations on the 8 and 14-pin ICs.

Figure 4-5. *Pin Locations*



4. Carefully turn the computer over and place it on the cover. (Do not secure the cover, you need to access this board again.)

5. Turn on the computer.

6. Go to the Monitor Setup program. (Refer to the owner's manual for directions.)

7. In this step, follow substep 7A if the computer has a hard disk drive (ZL-1-H/ZL-2-H). Follow substep 7B if the computer has a floppy disk drive (ZL-1/ZL-2).

   7A. Use the arrow keys to move to Password Control and select Modify Password.

   7B. Use the arrow keys to move to Modify System Password and select Password.

8. Press ENTER. The following error message is displayed:

   Error: Old password invalid, password cleared. Press RETURN to continue.

9. Cut the wire you soldered.

10. Secure the cover.

11. Press ENTER four times.

Chapter 5

Parts List

This chapter specifies the field-replaceable parts for the MinisPort Portable Computers. Refer to Figure 5-1 and Table 5-1 for the floppy disk drive computer (ZL-1/ZL-2) and to Figure 5-2 and Table 5-2 for the hard disk drive computer (ZL-1-H/ZL-2-H).

Figure 5-1. *Exploded View (ZL-1/ZL-2)*

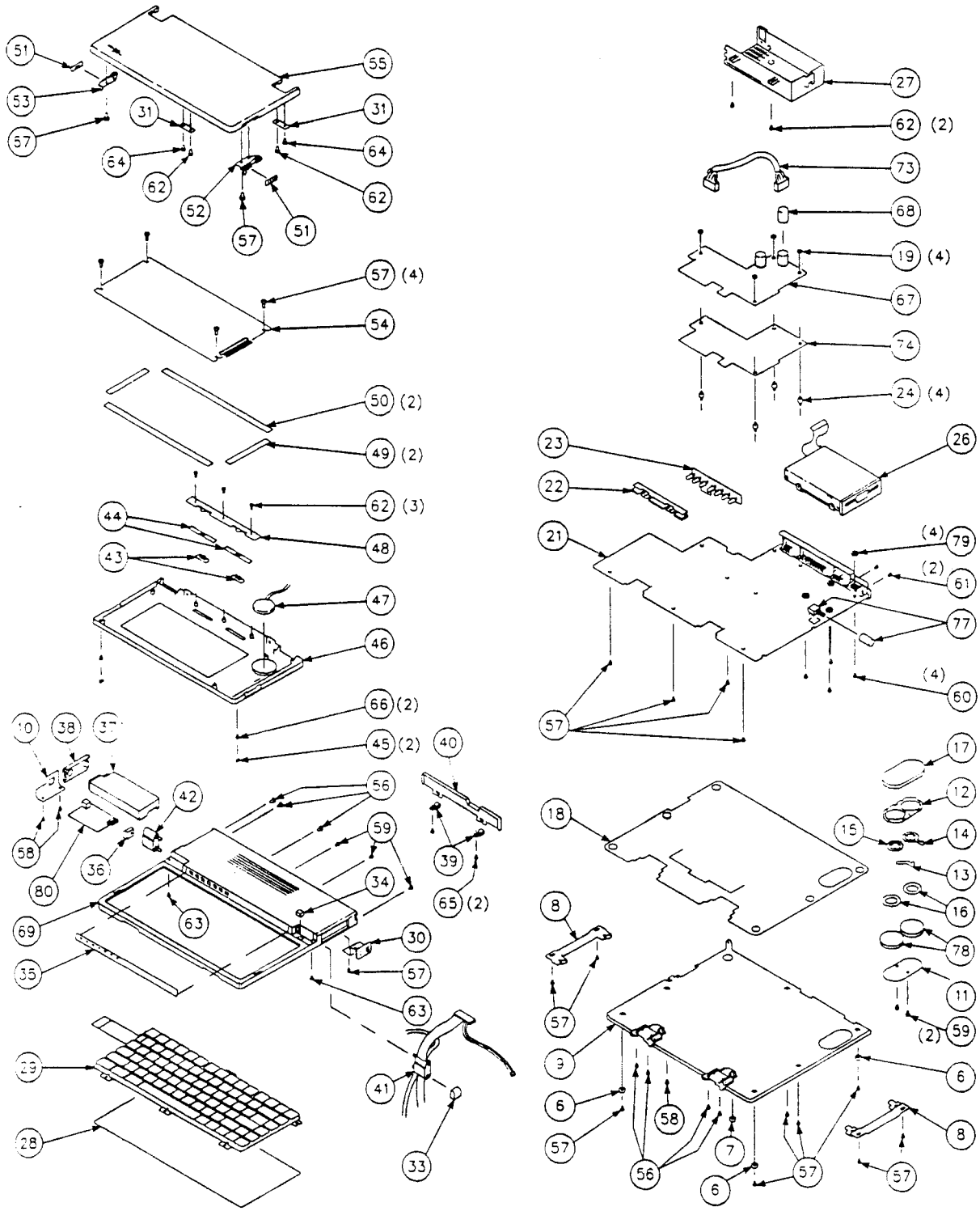


Table 5-1. Major Assemblies Parts List (ZL-1/ZL-2)

REFERENCE NO.	PART NO.	DESCRIPTION
Batteries and Parts		
37	969-1775	Battery, 11 w/hr
78	969-1763	Battery, lithium
13	969-1751	Battery contact (+)
14	969-1752	Battery contact (-)
15	969-1753	Battery contact (±)
Brackets and Holders		
27	969-1765	Battery bracket
31	969-1769	Hinge bracket
08	969-1746	Main board bracket
22	969-1760	Modem holder
Case Parts		
	969-1740	Keyboard cover
09	969-1747	Main bottom (includes handle)
46	969-1784	Display front
12	969-1750	Lithium battery case
55	969-1793	Display cover, rear
40	969-1778	I/O port cover
11	969-1749	Lithium battery cover
10	969-1776	Battery door
Cable Assemblies		
73	969-1741	Power cable (DC-to-DC converter card/main board)
41	969-1779	LCD I/F cable w/right hinge
Circuit Cards, Boards, and Modules		
21	969-1759	Main board (ZL-1)
21	969-1928	Main board (ZL-2)
75	969-1927	Memory card, 1-megabyte SIMM
23	969-1761	LED card set
48	969-1786	Brightness/contrast PCB assembly
67	969-1805	DC-to-DC converter card
54	969-1792	LCD module
30	969-1768	Security module
80		Modem
Drives		
26	969-1764	Floppy disk, 2-inch, 1-megabyte

continued...

REFERENCE NO.	PART NO.	DESCRIPTION
Hardware		
6	969-1744	Foot, rubber, screw-mount
7	969-1745	Foot, rubber, stick-on
42	969-1780	Hinge set, left
41	969-1779	Hinge set, right
33	969-1771	Side block, right hinge
36	969-1774	Side block, left hinge
52	969-1790	Latch, right
51	969-1789	Open slide latch
19	969-1757	Nut, 2.6 mm
52	969-1770	Latch, right
53	969-1771	Latch, left
65	969-1803	Screw, 2.0 x 3 mm, machine
59	969-1797	Screw, 2.0 x 4 mm, machine
60	969-1798	Screw, 2.0 x 6 mm, machine
66	969-1804	Screw, 2.0 x 8 mm, self-tapping
61	969-1799	Screw, 2.6 x 4 mm, machine
58	969-1796	Screw, 2.6 x 4 mm, machine
57	969-1795	Screw, 2.6 x 5 mm, machine
64	969-1802	Screw, 2.6 x 6 mm, machine
56	969-1794	Screw, 2.6 x 6 mm, machine
62	969-1800	Screw, 2.6 x 7 mm, self-tapping
63	969-1801	Screw, 2.6 x 8 mm, self-tapping
79	969-1959	Spacer support, floppy disk drive
24	969-1762	Support, DC-to-DC converter card
Insulators and Grounding Plates		
70	969-1743	LCD ground plate
28	969-1766	Keyboard insulator
16	969-1754	Lithium battery insulator, small
17	969-1755	Lithium battery insulator, large
20	969-1758	Spring sheet, grounding
74	969-1742	DC-to-DC converter card insulator
68	969-1806	Power transformer shield
Pushbuttons, Switches, and Controls		
34	969-1772	Lid-switch button
77	969-1770	Power pushbutton switch
43	969-1781	Brightness and Contrast slide controls
Miscellaneous		
Not shown	150-0436	AC adapter, 110/220 VAC
45	969-1783	Cushion, display module
44	969-1782	Sheet, VR slide
29	969-1767	Keyboard
35	969-1773	Label, LED, MinisPort
47	969-1785	Speaker, 33.3 mm diameter
49	969-1787	Double-sided tape (A)
50	969-1788	Double-sided tape (B)
Not shown	448-0536	Floppy disk, 2", 1-megabyte

Figure 5-2. *Exploded View (ZL-1-H/ZL-2-H).*

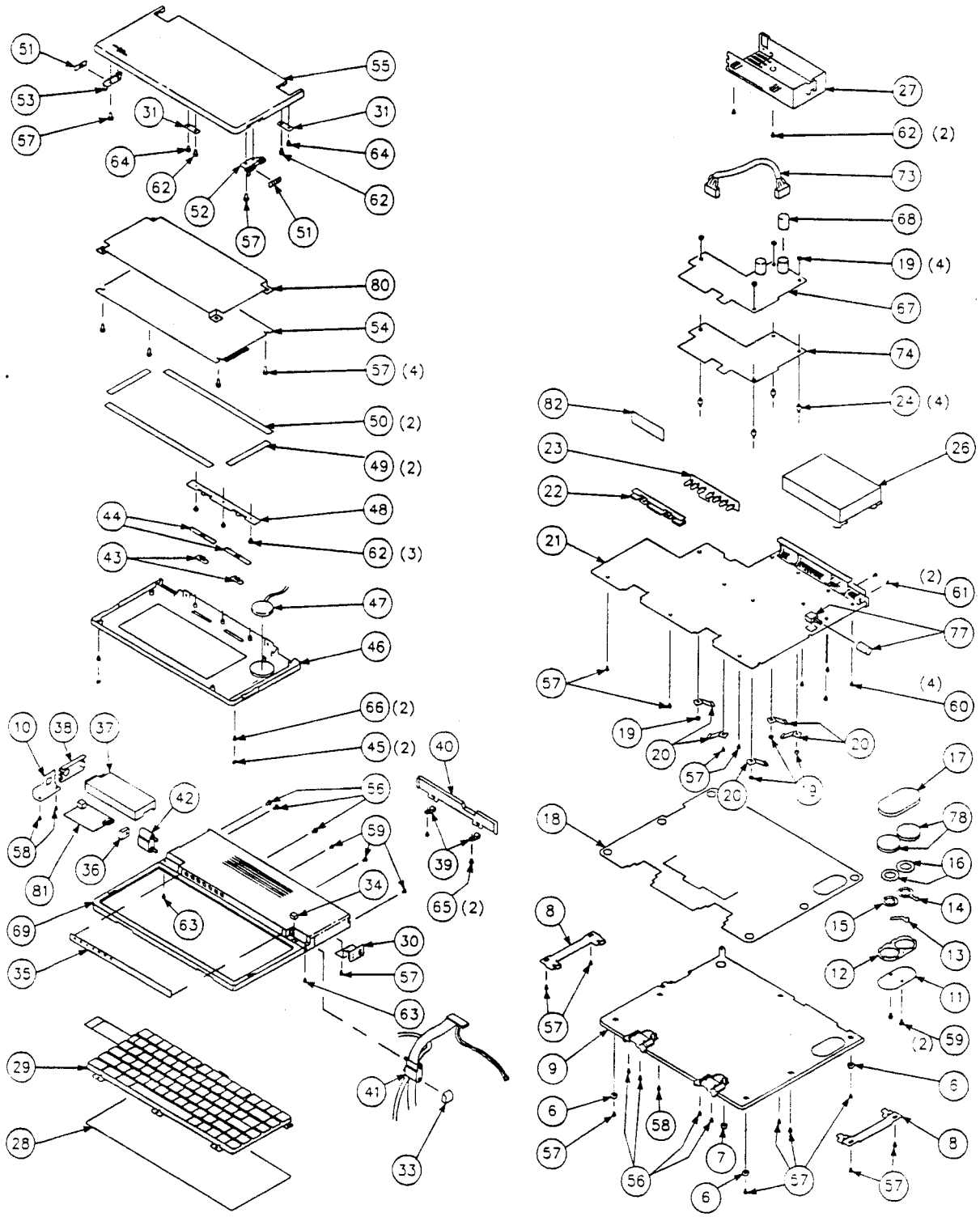


Table 5-2. Major Assemblies Parts List (ZL-1-H/ZL-2-H)

REFERENCE NO.	PART NO.	DESCRIPTION
Batteries and Parts		
78	969-1763	Battery, CR2430
37	969-2178	Battery, NICAD
13	969-2185	Battery contact (+)
15	969-1753	Battery contact (±)
14	969-1752	Battery contact (-)
Brackets and Holders		
27	969-1765	Battery bracket
31	969-1769	Hinge bracket
08	969-2180	Main board bracket
22	969-2191	Modem holder
Case Parts		
69	969-2182	Keyboard cover
09	969-2183	Main bottom (includes handle)
46	969-2184	Display front
12	969-1750	Lithium battery case
55	969-2186	Display cover, rear
82	969-2206	Hard disk drive cover
40	969-2213	I/O port cover
11	969-1749	Lithium battery cover
10	969-1748	Modem cover
38	969-2187	Battery door
35	969-2207	LED/nameplate
Cable Assemblies		
Not shown	134-2167	7-conductor data transfer cable
73	969-2214	Power cable (DC-to-DC converter card/main board)
76	969-2215	Hard disk drive interface cable
Circuit Cards, Boards, and Modules		
48	969-2181	Brightness/contrast PCB assembly
23	969-2191	LED card set
67	969-2121	DC-to-DC converter card
54	969-2122	LCD module
21	969-2123	Main board
79	240-7875-10	ROM BIOS card
81		Modem
Drives		
Not shown	150-525	Floppy drive, external, 3.5-inch
26	969-2120	Hard disk drive. 2.5-inch HC1606-CP2024

continued...

REFERENCE NO.	PART NO.	DESCRIPTION
Hardware		
06	969-2188	Foot, rubber, screw-mount
07	969-1745	Foot, rubber, stick-on
42	969-2189	Hinge set, left
41	969-2190	Hinge set, right, with LCD cable
36	969-1774	Side block, left hinge
33	969-1771	Side block, right hinge
51	969-1789	Open slide latch
52	969-1790	Latch, right
53	969-1791	Latch, left
19	969-1757	Nut, 2.6 mm
65	969-2193	Screw, 2.0 x 3 mm, machine
59	969-2194	Screw, 2.0 x 4 mm, machine
66	969-2195	Screw, 2.0 x 8 mm, self-tapping
61	969-2198	Screw, 2.6 x 4 mm, self-tapping
57	969-2199	Screw, 2.6 x 5 mm, machine
60	969-2200	Screw, 2.6 x 6 mm, machine
62	969-2201	Screw, 2.6 x 7 mm, machine
63	969-2202	Screw, 2.6 x 7 mm, self-tapping
64	969-2203	Screw, 2.6 x 8 mm, self-tapping
Not shown	969-2204	Screw, 4-40 x .25, machine
Not shown	969-2205	Spacer support, hard disk drive
Insulators and Grounding Plates		
Not shown	969-2211	Hard disk drive insulator
80	969-2208	LCD panel insulator
28	969-1766	Keyboard insulator
16	969-1754	Lithium battery insulator, small
17	969-1755	Lithium battery insulator, large
20	969-1758	Spring sheet, grounding
74	969-1742	DC-to-DC converter card insulator
Pushbuttons, Switches, and Controls		
34	969-1772	Lid-switch button
77	969-1770	Power pushbutton switch
43	969-1781	Brightness and Contrast slide controls
Miscellaneous		
45	969-1783	Cushion, display module
20	969-2209	Ground wire
29	969-1767	Keyboard
Not shown	595-4686	Owner's manual
Not shown	969-2121	AC adapter, 110/220 VAC
44	969-1782	Sheet, VR slide
47	969-1785	Speaker, 33.3 mm diameter
	969-2210	Pull tab for lithium battery

Specifications

These specifications are for the following MinisPort computers:

- Internal floppy disk and silicon disk versions (ZL-1 and ZL-2)
- Internal hard disk and silicon disk versions (ZL-1-H and ZL-2-H).

Differences between the two versions and optional features are indicated.

CPU and Memory

Processor

Type	80C88 CMOS, 8-bit data path.
Clock Speed	Software selectable: 8 MHz or 4.77 MHz (ZL-1), 10 MHz or 4.77 MHz (ZL-1-H).

Memory

Standard	1 megabyte read/write random-access memory (RAM).
Optional	1 megabyte additional for a total of 2-megabytes.

Input/Output

Video

Built-In Display:	640 x 200 pixel flat-panel LCD.
External:	CGA-type RGBI TTL-level output though a single DE-9S connector.

Sound:

Single channel (timer port 2) through a miniature transducer.

Serial Port

Asynchronous RS-232C through a DE-9P connector; parity (on, off, even, odd), word length (5, 6, 7, 8 bits), baud rate (110 to 9600 in MS-DOS). Firmware selectable as COM1 or COM2.

Parallel Port

Centronics-type output through a DB-25S connector. Firmware selectable as LPT1 or LPT2 for ZL-1-H, LPT1 only for ZL-1.

Drives

Silicon Disks	ROM-based, read-only disk drive that contains MS-DOS and transfer utility.
	RAM-based, read/write disk drive, configurable from EMS memory. RAM-based drive can be backed up by the Ni-Cad battery pack and lithium backup batteries.
Hard Disk	2.5-inch, 20 MB hard disk with 23 ms average access time (ZL-1-H only).
Internal Floppy Disk	2-inch, double-sided, double-density, 720K formatted capacity (ZL-1 only).
External Floppy Disks (optional)	2-inch, 3.5-inch, or 5.25-inch double-sided, double-density.

Keyboard

80-keys; full 84-key and 101-key keyboard compatibility maintained by using mode switching and multiple keys to duplicate keypad and special function key operation.

Modem (optional)

RJ-11 modular connector, Hayes-compatible. Firmware selectable as COM1 or COM2.

300/1200 baud (ZL-1/2),
300/1200/2400 baud (ZL-1/2-H).

Power Requirements

AC Power (adapter)

Input	110 VAC, 60 Hz, 0.4A; 240 VAC, 50 Hz, 0.2A input (autoswitching).
Output	9 VDC, 2A, ±10%.

DC Power (adapter)

Input	5.2 VDC to 9.9 VDC at 2.5A maximum.
Output	+5 VDC, 0.3A to 1.3A maximum; −10 VDC, ±20%, 50mA maximum; +10 VDC, ±20% 50mA maximum; −22 VDC, LCD voltage; 100 VAC, ±15 VAC EL voltage; 650 Hz, ± 15 Hz P-P.

Battery Power

6V (2.2 AHr for ZL-1-H; 1.8 AHr for ZL-1) removable battery pack with overcharge and short circuit protection. 1000 charge/discharge cycles.

Environment

Operating

50° to 95° F (10° to 35° C) at 10% to 90% relative humidity (non-condensing) from 200 feet below sea level to 10,000 feet above sea level (unpressurized).

Non-Operating

32° to 140° F (20° to 60° C) at 5% to 95% relative humidity (non-condensing) from 200 feet below sea level to 40,000 feet above sea level (unpressurized).

Shipping

−4° to +140° (−20° to +60° C) at 5% to 95% relative humidity (non-condensing) from 200 feet below sea level to 40,000 feet above sea level (unpressurized).

Size and Weight

Dimensions

12.4" wide x 9.8" deep x 1.3"
tall (lid closed), 7.75" tall (lid open).

31.5 cm x 24.9 cm x 3.36 cm.

Weight

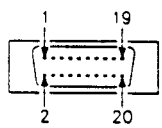
6 lbs (2.7 kg), including battery.
5.63 lbs (1.88 kg), without battery.

Connectors

The following tables provide pinouts and illustrations of the connectors.

External Disk Drive Connector and Pinout

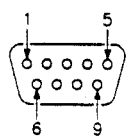
The external disk drive connector provides the signals necessary to connect an external disk drive to the computer. The computer supports double-density 720K, 2-inch; 720K, 3.5-inch; and 360K, 5.25-inch external floppy disk drives.



PIN	SIGNAL
1	Disk change
2	Side select
3	Read data
4	Ground
5	Write protect
6	Track 0
7	Index
8	Write enable
9	Write data
10	Ground
11	Step
12	Ground
13	Direction select
14	Drive select 2
15	RPM
16	Motor on
17 – 18	V_{CC}
19 – 20	Ground

RS-232C Serial Connector and Pinout

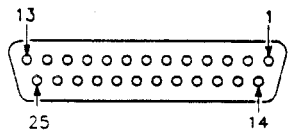
The serial connector is a 9-pin standard RS-232C DTE input/output port for use with a serial printer or peripheral. This port can be configured as COM1 or COM2 using the Setup program.



PIN	SIGNAL
1	Carrier detect
2	Receive data
3	Transmit data
4	Data terminal ready
5	Signal ground
6	Data set ready
7	Request to send
8	Clear to send
9	Ring detect

Parallel Connector and Pinout

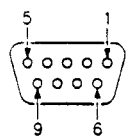
The parallel connector provides Centronics-type output signals for a parallel printer or peripheral. Using the Setup program, this port can be configured as LPT1 or LPT2.



PIN	SIGNAL
1	Strobe
2	Data bit 0
3	Data bit 1
4	Data bit 2
5	Data bit 3
6	Data bit 4
7	Data bit 5
8	Data bit 6
9	Data bit 7
10	Acknowledge
11	Busy
12	Paper out
13	Select
14	Automatic line feed
15	Error
16	Initialize
17	Select in
18 – 25	Ground

CRT Video Connector and Pinout

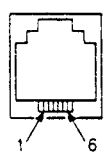
The CRT connector supplies RGB TTL-level video signals for an external color video monitor.



PIN	SIGNAL
1	Ground
2	Ground
3	Red
4	Green
5	Blue
6	Intensity
7	Not connected
8	Horizontal sync
9	Vertical sync

Telephone Line Connector and Pinout

Computers equipped with the optional internal modem contain a telephone line connector that supplies the necessary signals for telephone-based communication. Using the Setup program, this port can be configured as COM1 or COM2.



PIN	SIGNAL
1	Not connected
2	Not connected
3	Ring
4	Tip
5	Not connected
6	Not connected